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3924 MEADE ST.
DENVER, COLORADO

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PHOTOFACT* Folder
*TRADE MARK

ADMIRAL CHASSIS 19Y4G, GF, & Radio Chassis 3D1B

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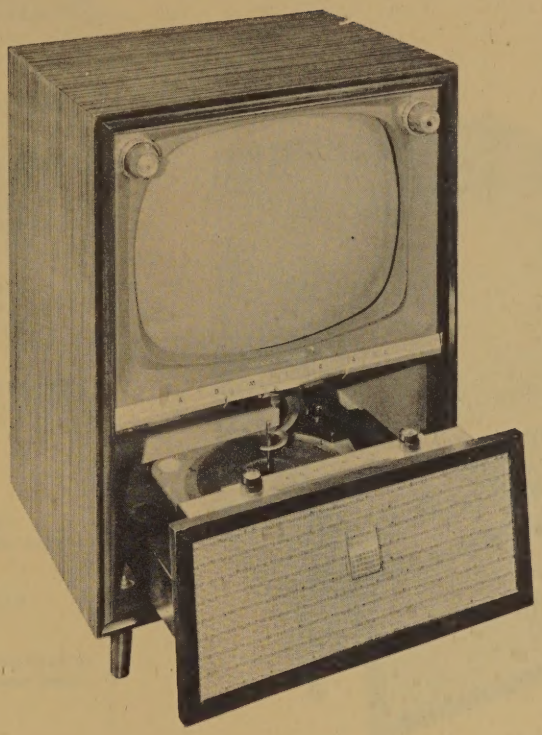

ADMIRAL MODEL K23A6 (Ch. 19Y4G)

TRADE NAME	Admiral Models K23A6, K23A7 (Ch. 19Y4G, 19Y4GF) Radio Chassis 3D1B or 3D1C
MANUFACTURER	Admiral Corp., 3800 W. Cortland St., Chicago 47, Illinois
TYPE SET	TV-Radio-Phono Combination Receiver
TUBES	Twenty-two
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.5 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 25.75MC, Sound IF 21.25MC (Intercarrier) AM Radio 535-1620KC, AM IF 455KC

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RECORD CHANGER IS ADMIRAL MODEL RC-624

ADMIRAL CHASSIS 19Y4G, GF, & Radio Chassis 3D1B

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DISASSEMBLY INSTRUCTIONS

TV CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.
2. Remove 17 wood screws. Remove rear cover.
3. Remove 2 wood screws holding AC interlock bracket and 2 wood screws holding antenna terminal bracket.
4. Disconnect radio-phono power plug, speaker plug, audio plug, dial light plug, on/off volume and contrast control plug, front panel control plug, yoke plug, HV lead and picture tube socket.
5. Remove ion trap and centering magnet assembly.
6. Remove wing nut holding yoke and remove yoke.
7. Remove 3 bolts holding tuner assembly bracket to cabinet top.
8. Remove 4 chassis bolts. Remove chassis.
9. Remove 2 wood screws holding control panel assembly to cabinet, also unclip on/off volume and contrast control assembly from inside cabinet front.

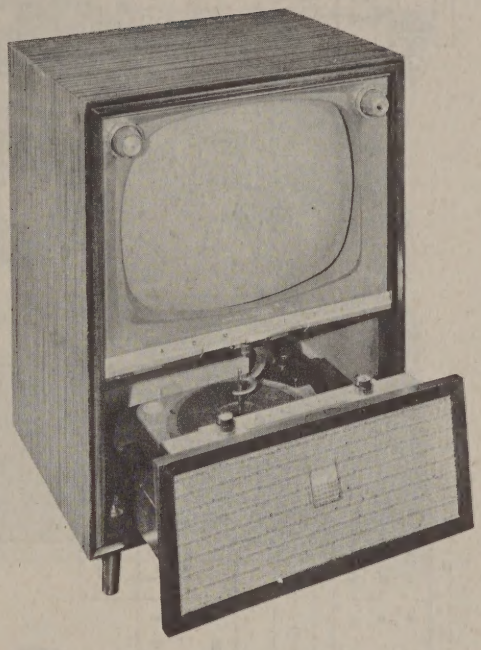
RADIO CHASSIS

1. Remove 17 wood screws. Remove rear cover.
2. Remove radio-phono power plug and audio plug.
3. Remove 1 wood screw holding cable clamp to the rear of radio-phono drawer.
4. Lay cabinet on side on a soft surface.
5. Remove phono motor plug, phono input plug and 2 radio antenna plugs.
6. Remove 4 push-on type control knobs.
7. Remove 6 wood screws holding chassis mounting bracket.
8. Remove 7 metal screws holding chassis to drawer panel.

SPEAKER REMOVAL

1. Remove radio chassis from radio-phono drawer.
2. Disconnect plug from TV chassis.
3. Remove 4 speaker nuts. Remove speaker.

NOTE: If it is necessary to remove TV chassis for servicing, it is also necessary to remove the speaker. The audio output transformer is mounted on the speaker and must be connected for proper operation.



MODELS	CHASSIS
K23A6, K23A7	19Y4G, 19Y4GF

Radio Chassis 3D1B or 3D1C

ADMIRAL CHASSIS 19Y4G, GF, & Radio Chassis 3D1B

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 4 push-on type control knobs. Remove 4 wood screws holding metal strip at the top edge of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit may be made by adjusting the flexible shaft at the back of set. Adjust the horizontal adjustment slug of L22 until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate "Sound IF Detector Buzz" adjust the ratio detector secondary (L21) located on rear of chassis. (See tube location chart).

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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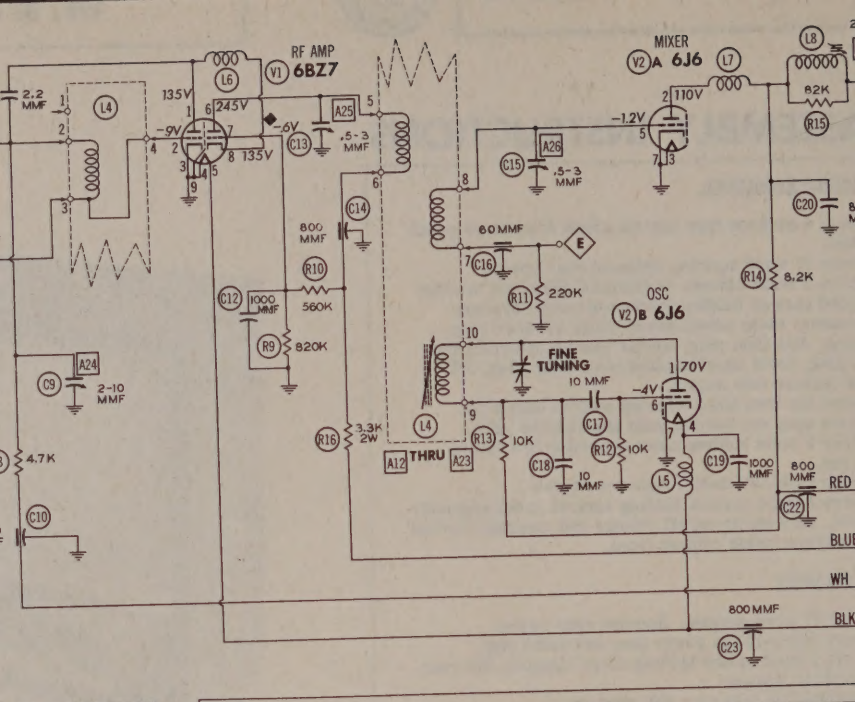

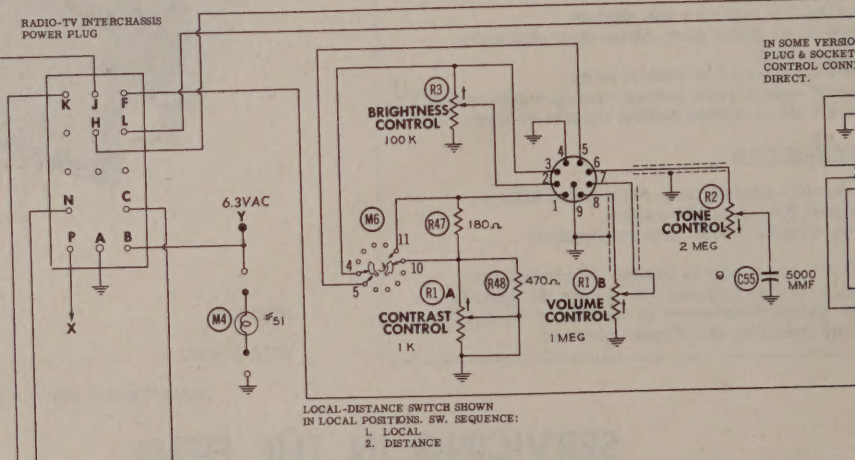

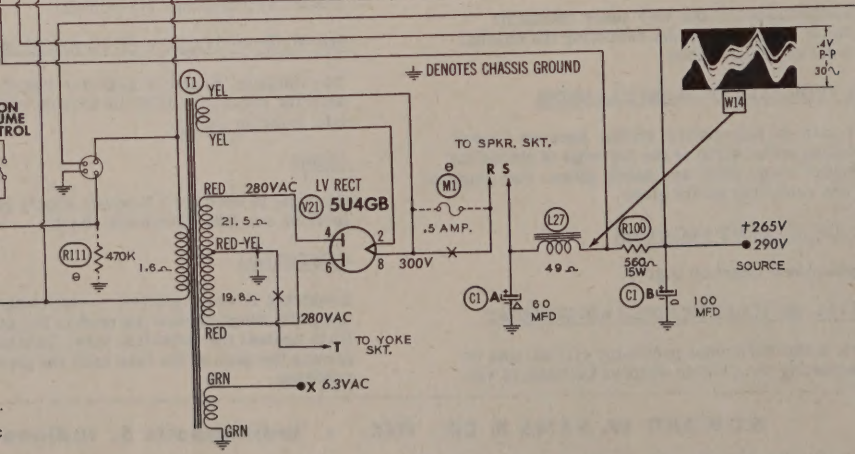

R ONE OHM NOT
SEE PARTS LIST)

LOCKWISE ROTATION
AFT END)

LS
TO-

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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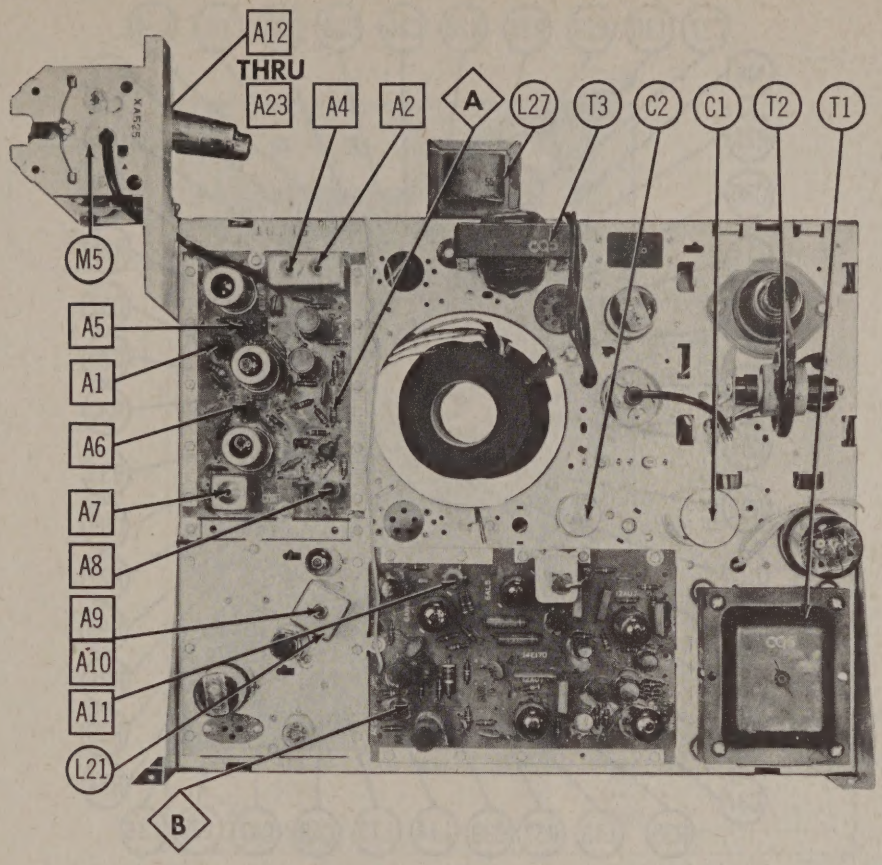
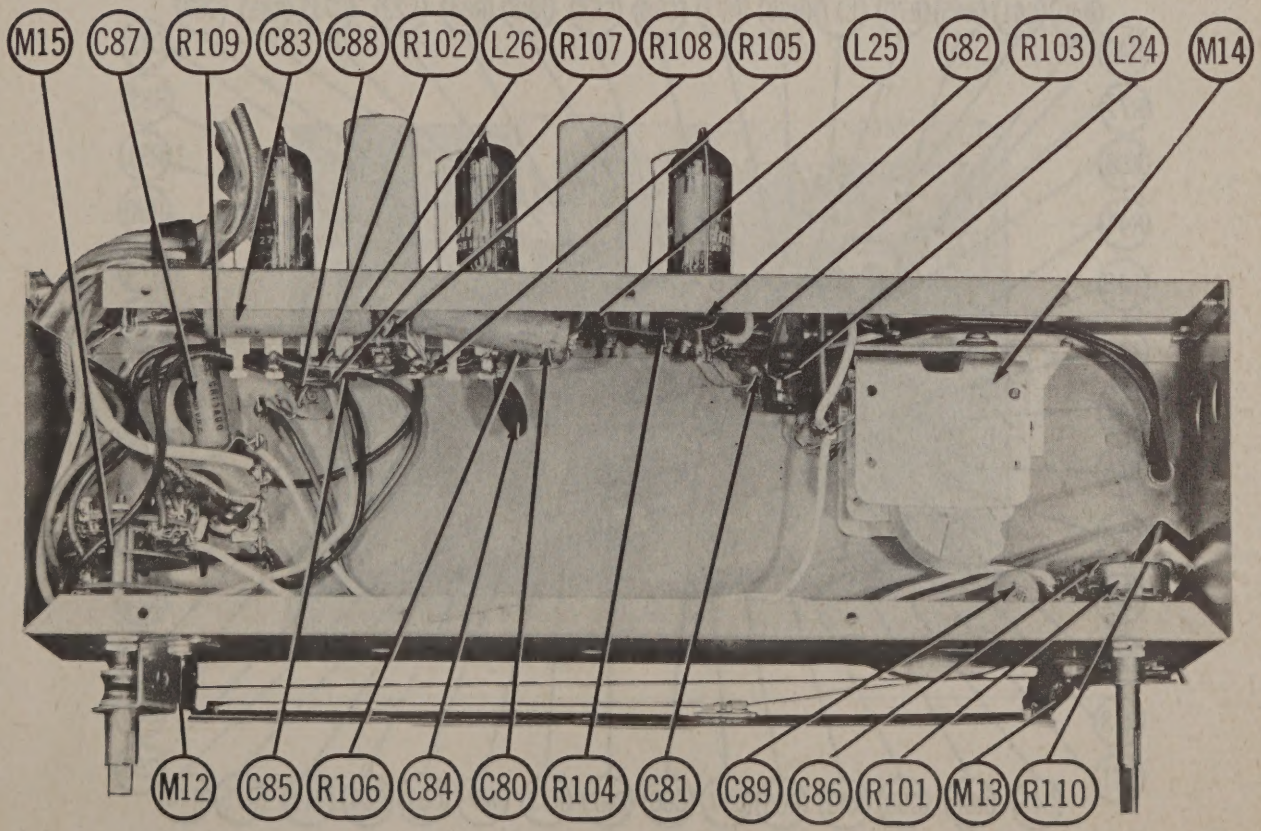
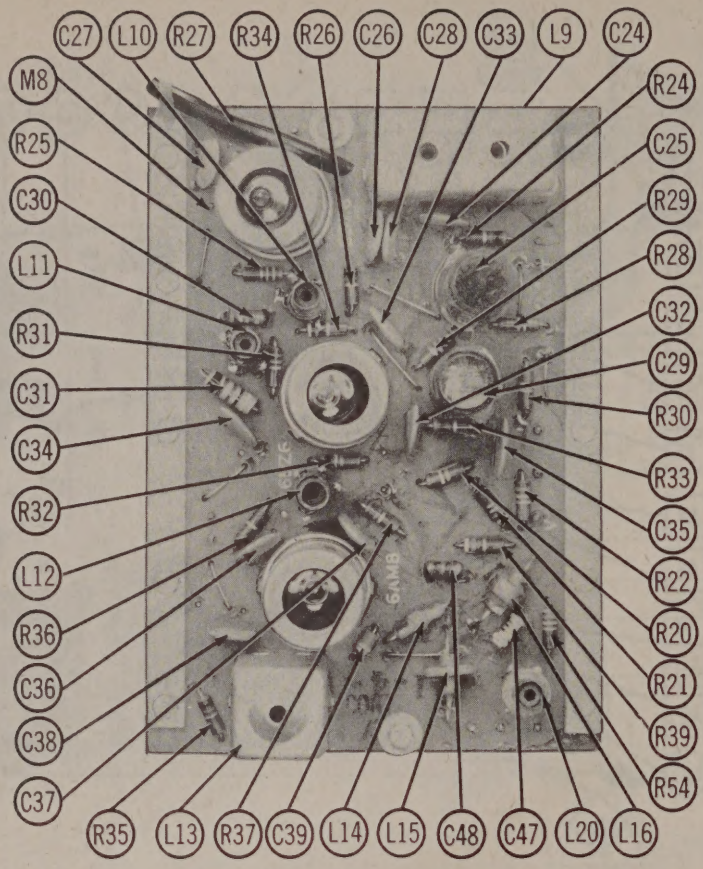


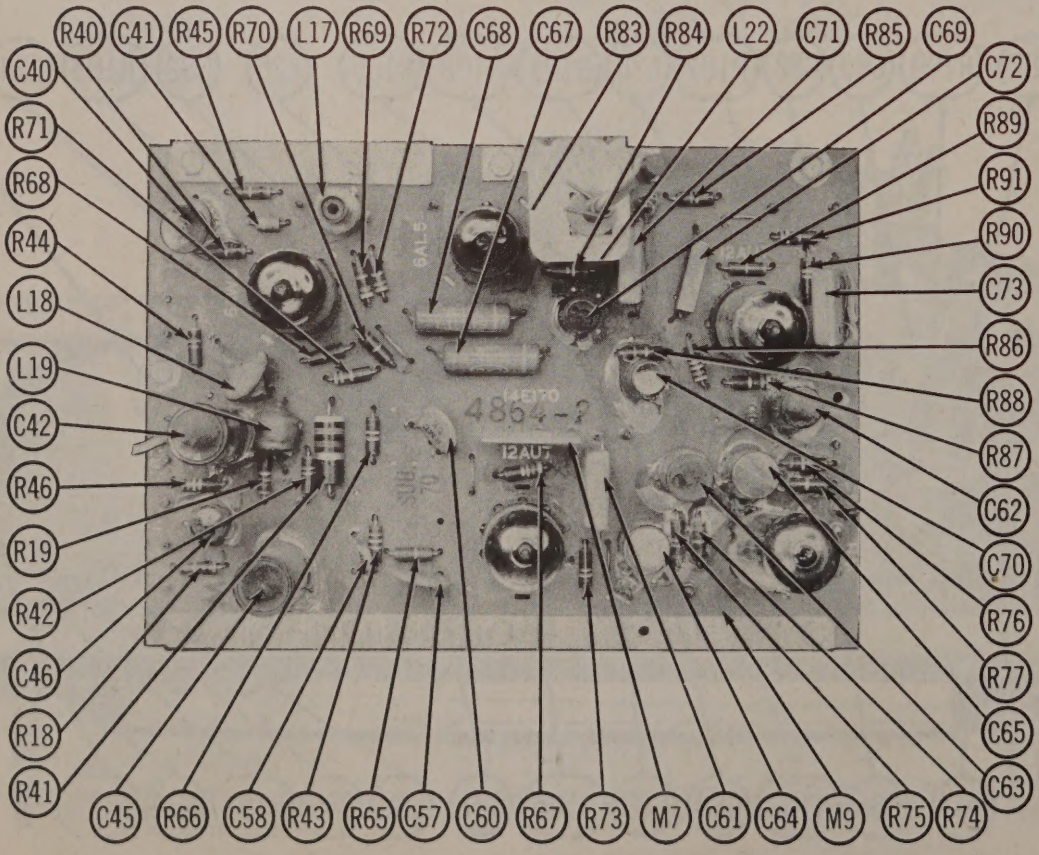
CHASSIS TOP VIEW



RADIO CHASSIS-BOTTOM VIEW

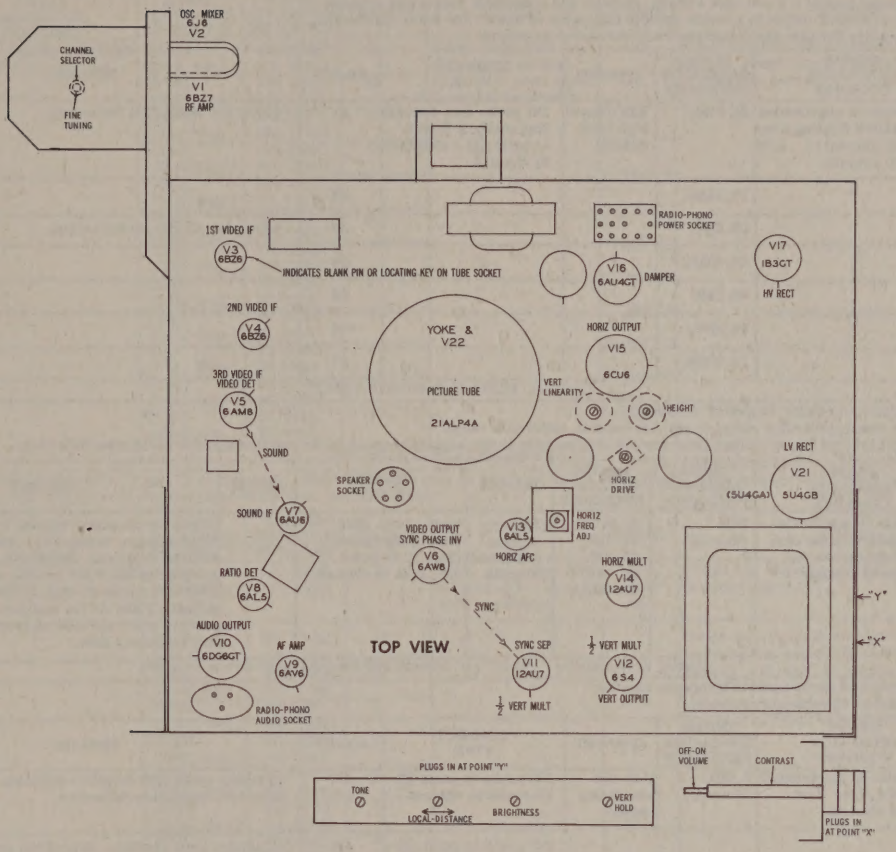


VIDEO IF SUB-CHASSIS



SYNC CIRCUIT SUB-CHASSIS

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V21, Fuse (M1)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V10**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V22**
Has pic, no sound - **V7, V8, V9, V10**

SYNC FAILURE
No vert. sync - **V6, V11, V12**
No horiz. sync - **V6, V13, V14**
No vert. or horiz. sync - **V6, V11**

SWEEP FAILURE
No raster, has sound - **V14, V15, V16, V17, V22**
No vertical deflection - **V11, V12**
Poor vert. linearity or foldover - **V11, V12**
Poor horiz. linearity or foldover - **V14, V15, V16**
Narrow picture - **V14, V15, V16, V17, V21**
Vert. off freq. - **V6, V11, V12**
Horiz. off freq. - **V6, V13, V14**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage leads should be securely taped away from chassis.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 having pin 1 removed.
Disconnect antenna leads and short the antenna terminals with a short clip lead.
Set the contrast control to minimum contrast.
Connect the negative lead of a 3 volt bias battery to point Ⓑ. Connect positive to chassis.
Use only enough generator output to provide useable indication on the VTVM (1 volt maximum).
Allow 15 to 20 minutes for test equipment and receiver warm-up period.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over dummy converter. Low side to chassis.	21.25MC	Any unused high band channel	DC probe thru decoupling network (Fig. 1) to point Ⓐ. Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	27.25MC	"	"	A2	"
3.	"	"	22.6MC	"	"	A3	Adjust for maximum deflection.
4.	"	"	26.85MC	"	"	A4	"
5.	"	"	25.3MC	"	"	A5	"
6.	"	"	22.3MC	"	"	A6	"
7.	"	"	23.75MC	"	"	A7	"

OVERALL VIDEO IF RESPONSE CHECK

Leave bias connected as under "Video IF Alignment".
Use only enough sweep generator output to provide useable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	23MC (Unmod)	21.25MC 22.0MC 23.0MC 25.0MC 25.75MC	Any unused high band channel	Vert. Amp. thru decoupling network (Fig. 1) to point Ⓐ. Low side to chassis.		Check for response similar to Fig. 2. If necessary, retouch A1, thru A7 to obtain desired response. Adjust A4 and A5 for position of 25.75MC marker and amplitude of response curve on high frequency side. Adjust A3 and A6 for position of 23.0MC marker and amplitude of response curve on low frequency side.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Disconnect antenna and short antenna terminals together.
Set contrast control for minimum contrast.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.01MFD	High side to pin 8 (plate) of 6AM8 (V5). Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe to point Ⓒ. Common to chassis.	A8, A9	Attenuate generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point Ⓓ. Common to chassis.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.01MFD	High side to pin 8 (plate) of 6AM8 (V5). Low side to chassis.	4.5MC (450KC Swp.	4.5MC	Any	Vert. amp. to point Ⓒ. Low side to chassis.	A8, A9	Disconnect stabilizing capacitor C5. Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
10.	"	"	"	"	"	Vert. amp. to point Ⓓ. Low side to chassis.	A10	Reconnect C5. Adjust A10 so that 4.5MC marker occurs at center of crossover lines as in Fig. 4. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Remove the bias battery and replace the original tuner oscillator tube in its socket. Tune in a TV station. Adjust A8 and A9 for maximum deflection with the VTVM connected as in step 9 of "Sound IF Alignment Using AM Signal Generator and VTVM". Adjust A10 for best program sound with minimum buzz. This point will be found between two maximum buzz peaks.

4.5MC TRAP ALIGNMENT

Short L15 with a short jumper wire.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	.01MFD	High side to pin 8 (plate) of 6AM8 (V5). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point Ⓒ. Common to chassis.	A11	Adjust for MINIMUM deflection.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in a TV station and adjust A11 for minimum 4.5MC beat interference in picture.

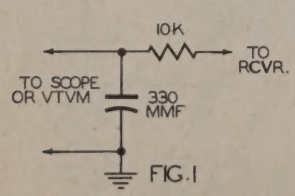


FIG. 1

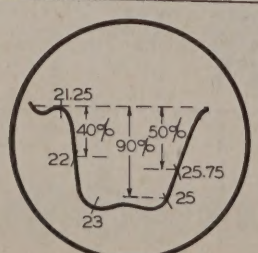


FIG. 2

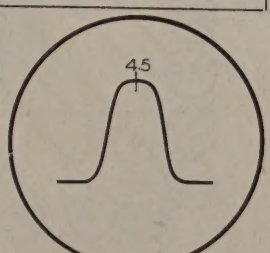


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

Replace original oscillator tube in its socket. The channel oscillator adjustments screws are reached through a hole to the left and just below the channel switch shaft. The correct adjustment screws are accessible through this hole as the channel switch is turned to each channel.
Leave bias connected as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp.)	211. 25MC 215. 75MC	13	Vert. amp. thru decoupling network (Fig. 1) to point (A). Low side to chassis.	A12	Adjust to place video marker at 50% as in Fig. 5. Sound marker should not exceed 5% on response curve.
			207MC (10MC Swp.)	205. 25MC 209. 75MC	12		A13	
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11		A14	
			195MC (10MC Swp.)	193. 25MC 197. 75MC	10		A15	
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9		A16	
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8		A17	
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7		A18	
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6		A19	
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5		A20	
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4		A21	
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3		A22	
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2		A23	

RF AND MIXER ALIGNMENT

Leave bias connected as under "Video IF Alignment". The bias supply may be removed if it is difficult to obtain a response of sufficient amplitude. If bias is removed, short out to chassis point where bias was connected.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp.)	193. 25MC 197. 75MC	10	Vert. amp. thru 10KΩ to point (E). Low side to chassis.	A24, A25, A26	Adjust for response similar to Fig. 6 with markers above 90%.
14.	"	"	213MC (10MC Swp.)	211. 25MC 215. 75MC	13			Check for response similar to Fig. 6. If markers fall below 70% on any channel, make SLIGHT compromise adjustments of A24, A25 and A26 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			207MC (10MC Swp.)	205. 25MC 209. 75MC	12			
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11			
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5			
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4			
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2			

RADIO ALIGNMENT

Remove the bias supply.
Turn the function switch to the "Radio" position.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
15.	.1MFD	High side to antenna stator lug on tuning gang. Low side to chassis.	455KC (Unmod.)	Radio	Tuning gang fully open	Across voice coil	A27,A28 A29,A30	Adjust for maximum output.
16.	"	"	1620KC	"	"	"	A31	"
17.	"	Loop	1400KC	"	Tune to 1400KC signal	"	A32	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

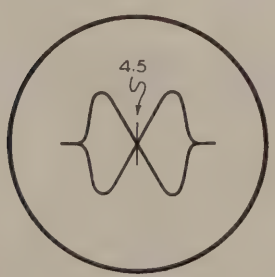


FIG. 4

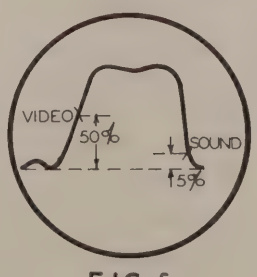


FIG. 5

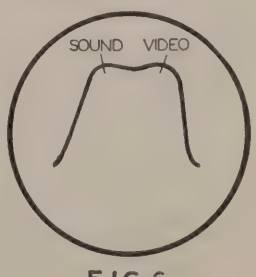
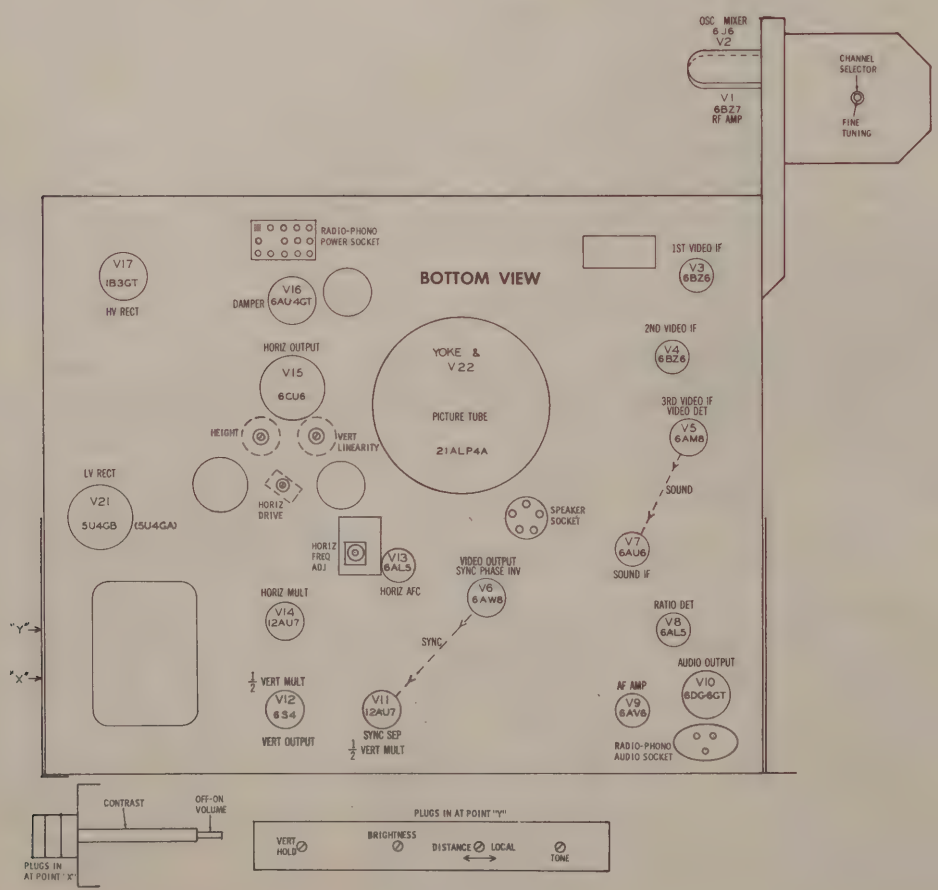


FIG. 6

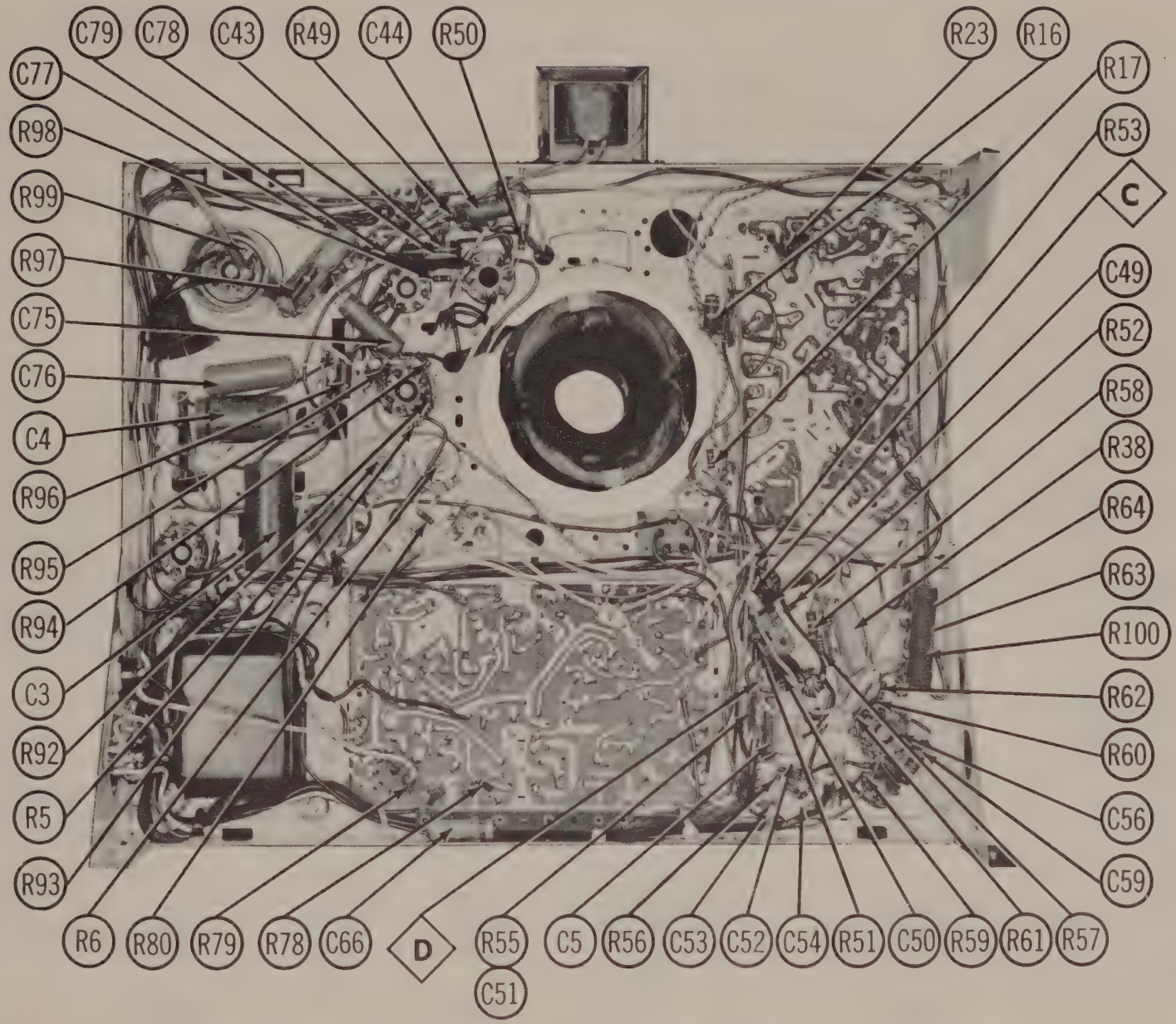
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	INF	1. 2Meg	0Ω	0Ω	. 1Ω	† 3. 3KΩ	350KΩ	INF	0Ω
V 2	6J6	■ 11KΩ	■ 8. 7KΩ	0Ω	. 1Ω	220KΩ	10KΩ	0Ω		
V 3	6BZ6	300KΩ	56Ω	0Ω	. 1Ω	▲ 1KΩ	▲ 1KΩ	0Ω		
V 4	6BZ6	100KΩ	▲ 47Ω	. 1Ω	0Ω	† 1KΩ	† 1KΩ	130KΩ		
V 5	6AM8	120Ω	. 4Ω	■ 3. 2KΩ	0Ω	. 1Ω	■ 1KΩ	. 3Ω	4. 7KΩ	0Ω
V 6	6AW8	3. 3KΩ	1. 5Meg	† 10KΩ	. 1Ω	0Ω	200Ω	1Meg	■ 30KΩ	† 4. 7KΩ
V 7	6AU6	470KΩ	0Ω	0Ω	. 1Ω	■ 1KΩ	■ 1KΩ	120Ω		
V 8	6AL5	INF	INF	0Ω	. 1Ω	10KΩ	0Ω	10KΩ		
V 9	6AV6	4. 7Meg	470Ω	0Ω	. 1Ω	0Ω	0Ω	† 470KΩ		
V 10	6DG6GT	TP	. 1Ω	† 450Ω	† 270Ω	850KΩ	TP	0Ω	20KΩ	
V 11	12AU7	▲ 3Meg	220KΩ	220KΩ	0Ω	0Ω	† 100KΩ	2. 2Meg	0Ω	. 1Ω
V 12	6S4	NC	1. 2KΩ	1. 5Meg	0Ω	. 1Ω	1. 5Meg	NC	NC	▲ 6KΩ
V 13	6AL5	15Ω	15Ω	. 1Ω	0Ω	4. 8Meg	0Ω	4. 8Meg		
V 14	12AU7	† 82KΩ	150KΩ	1. 5KΩ	0Ω	0Ω	† 5. 6KΩ	5Meg	1. 5KΩ	. 1Ω
V 15	6CU6	TP	. 1Ω	TP	■ 3KΩ	470KΩ	TP	0Ω	0Ω	TOP CAP ▲ 16Ω
V 16	6AU4GT	NC	TP	300KΩ	NC	† 49Ω	TP	. 1Ω	0Ω	
V 17	1B3GT		PINS	1-8	HAV■	INF	RESISTANCE			TOP CAP ▲ 490Ω
V 18	6BE6	22KΩ	. 7Ω	0Ω	♦ . 1Ω	♦† 1. 6KΩ	♦† 14KΩ	♦ 1. 2Meg		
V 19	6BA6	♦ 1. 2Meg	0Ω	0Ω	♦ . 1Ω	♦† 1. 6KΩ	♦† 100KΩ	150Ω		
V 20	6AV6	4. 7Meg	0Ω	0Ω	♦ . 1Ω	♦ 1. 2Meg	♦ 300KΩ	♦† 470KΩ		
V 21	5U4GB	NC	100KΩ	NC	22Ω	NC	20Ω	NC	100KΩ	
V 22	21ALP4A	0Ω	56KΩ	PIN 6 0Ω	PIN 10 ▲ 5. 6KΩ	PIN 11 ■ 200KΩ	PIN 12 . 1Ω			

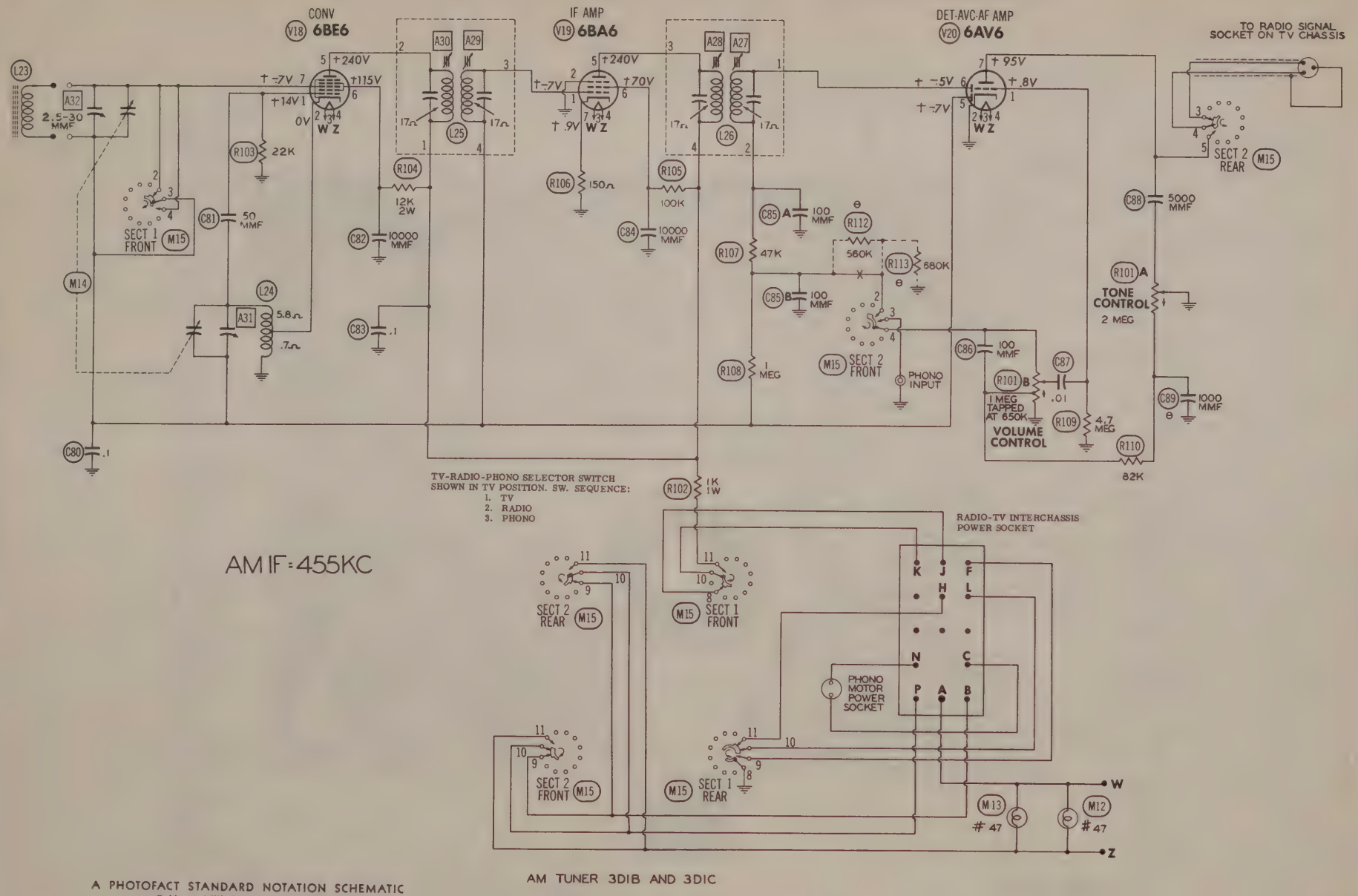
† MEASURED FROM PIN 8 OF V21.
■ MEASURED FROM 160V LINE.
▲ MEASURED FROM PIN 7 OF V4.
▲ MEASURED FROM PIN 3 OF V16.
♦ MEASURED IN "RADIO" POSITION.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART



CHASSIS BOTTOM VIEW CAPACITOR & RESISTOR IDENT.



AM TUNER 3DIB AND 3DIC

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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AM RADIO TUNER SCHEMATIC

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		ADMIRAL PART No.	STANDARD REPLACEMENT	
V1	RF-Amplifier	6BZ7	6BZ7	
V2	Mixer-Oscillator	6J6	6J6	
V3	1st. Video IF Amplifier	6BZ6	6BZ6	
V4	2nd. Video IF Amplifier	6BZ6	6BZ6	
V5	3rd. Video IF Amplifier-Video Detector	6AM8	6AM8	
V6	Video Output-Sync Phase Inverter	6AW8	6AW8	
V7	Sound IF Amplifier	6AU6	6AU6	
V8	Ratio Detector	6AL5	6AL5	
V9	AF Amplifier	6AV6	6AV6	
V10	Audio Output	6DG6GT	6DG6GT	
V11	Sync Separator- Vert. Mult.	12AU7	12AU7	
V12	Vert. Mult.-Vert. Output	6S4A	6S4A	
V13	Horiz. AFC	6AL5	6AL5	
V14	Horiz. Mult.	12AU7	12AU7	
V15	Horiz. Output	6CU6	6CU6	
V16	Damper	6AU4GT	6AU4GT	
V17	HV Rectifier	1B3GT	1B3GT	
V18	AM Converter	6BE6	6BE6	
V19	AM IF Amplifier	6BA6	6BA6	
V20	Det.-AVC-AF Amplifier	6AV6	6AV6	
V21	LV Rectifier	5U4GB	5U4GB	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	ADMIRAL PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V22	21ALP4A ①	21ALP4A ① 21ALP4B ① 21ALP4	21ALP4A ① 21ALP4A/B ① 21ALP4	21ALP4A ② 21ALP4A/B ② 21ALP4	① Aluminized ② Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ADMIRAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲60	350	67D15-110	AFH3-29-25		FP330.9	TM-2030	D-177	R2074
B	▲100	350							
C2A	▲5	200	67D15-109	E92C2		FP217.8	TM-3123	T-395	R1652
B	■60	200				TC50X		FM-4504	
C	20	50							
C3	40	300	67A4-19	PRS350V40	BBR4035	TC78	TD-40-350	FM-4540	TVA-1611
C4	10	475	67A4-22	PRS500V10	BBR1050	TC81	TD-10-475	MT-4710	TVA-1802
C5	4	50	67A4-9	SRE50V5	BBR4-50T	TC30	TD-4-50	MMT-0505	TVA-1303

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	1			NP0-SI1	TCZ-1	TZ03	NP0A-010	ZT-5515	5TCCB-V1	
C7	6.8		94D47-53	NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C8	6.8		94D47-53	NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C9	2-10		94D92-71		829-10					
C10	800		94C37-90							
C11	2.2		94C37-97	NP0-SI2.2	TCZ-2R2	Z006	NP0A-2R2		5TCCB-V22	
C12	1000		94C37-90	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C13	.5-3		98A45-23		829-3		3115-01-0R5	CT565A		
C14	800		94C37-90							
C15	.5-3		98A45-23		829-3		3115-01-0R5	CT565A		
C16	60		94D92-76							
C17	10		94D47-51							
C18	10		94D47-51							
C19	1000		94C37-90	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C20	8.2		94D92-74	NP0-DI8.2		Z016	NP0A-8R2			
C21	120		65C6-66	BPD-00012	DD-121	G044	811-121	UC-5312	5GA-T12	
C22	800		94C37-90							
C23	800		94C37-90							
C24	5000		65C43-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C25	.33	200	64B16-50							Note 3
C26	5000		65C43-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C27	5000		65C43-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C28	5000		65C43-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C29	.22	200	64B16-51					PTS4022		
C30	3.3		65C6-89	NP0-SI3.3	TCZ-3R3	TZ06	NP0A-3R3	ZT-5533	5TCCB-V33	
C31	22		65C6-113	NP0-SI22	TCZ-22	TZ14	NP0K-220		5TCC-Q22	
C32	5000		65C43-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C33	5000		65C43-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C34	5000		65C43-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C35	10000		65C43-2	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C36	5000		65C43-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C37	5000		65C43-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C38	5000		65C43-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C39	6.8		65B28-068	NP0-SI6.8	TCZ-6R8	TZ08	NP0A-6R8	ZT-5568	5TCCB-V68	
C40	.1	200	64B16-53		DF-104			PTS401		
C41	6.8		65B28-068	NP0-SI6.8	TCZ-6R8	TZ08	NP0A-6R8	ZT-5568	5TCCB-V68	
C42	.22	400	64B16-28					PTS4022		
C43	.0068	600	64B9-14	BPD-0068	D6-682	CUB6D68	GP3-333-682		6TM-D68	
C44	.01	600	64B9-13	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C45	.22	200	64B16-51					PTS4022		
C46	.01	200	64B16-59	BPD-01	D6-103	K082	GP3-333-103	PTS411	5HK-S1	
C47	10		65C6-44	NP0-SI10	TCZ-10	TZ09	NP0K-100	ZT-541	5TCC-Q1	
C48	20		65C6-51	NP0-SI20	TCZ-20	TZ13	NP0K-200	ZT-542	5TCC-Q2	
C49	5000		65D10-5	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C50	180		65D10-52							
C51A	500				D6-501	K061	GP2K-501	UC-535	5GA-T5	
B	2200		†63C6-15	†PA445	DD-222	K073	811-0022	UC-5222	5GA-D22	
C	4700				DD-472	K079	811-0047	DC-525	5HK-D47	

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C52	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	Note 1
C53	5000		65D10-5	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C54	50		65C6-4	SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C55	5000		65D10-5	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	Note 2
C56	10000		65C43-2	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C57	.0047	600		BPD-0047	DD-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C58	150		65D10-85	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C59	10000		65C43-2	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C60	5000		65D10-5	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C61	2200	500	65B21-222	1464-0022		1R5D22			MS-222	
C62	.033	200	64B16-56							
C63	.033	600	64B15-10							
C64	.047	400	64B16-32	BPD-05	DF-503			PTS4147		
C65	.047	600	64B16-9	BPD-05	DF-503					
C66	.001	1600	64A2-28	HVD-30-001	DD30-102	CUB16D1	3KV-102	DC3021	MB-D1	
C67	.001	400	64B21-1	SI1000	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C68	.001	400	64B21-1	SI1000	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C69	.0047	400	64B16-38	BPD-0047	DD-472	K079	811-0047	PTS6247	5HK-D47	
C70	.015	200	64B16-58	BPD-015	DD16-153		821-015		10HKB-S15	
C71	3900	500	65B21-392	1464-0039		1R5D39		MCB463	MS-239	
C72	390	500	65B21-391	1469-00039	D6-391	5R5T39	811-391	MCB243	MS-339	
C73	680	500	65B21-681	1464-00068	D6-681	1R5T68	811-681		MS-368	
C74	.0047	600		BPD-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	Note 1
C75	.047	600	64B9-9	BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	
C76	.1	600	64B9-7	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C77	.047	1000	64A2-30	P1088N-047		CUB16S5		PT1615	10TM-S47	
C78	230	3000	65D10-69							
C79	150	3000	65D10-68	HVD-30-150	DD30-151	V3T15	3KV-151		30GA-T15	
C80	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C81	50			SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C82	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C83	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C84	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C85A	100			BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
B	100			BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C86	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C87	.01	400		BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C88	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C89	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	Note 4

Note 1. Not used in some versions.
Note 2. C55 was changed to 1000MMF in Run 16 versions.
Note 3. Some versions may use .22MFD in this application.
Note 4. Some versions use 2000MMF in this application.
† Items C51A, C51B, C51C, R55A, R55B and R55C are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ADMIRAL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω	½	75B11-28	F1-5	RTV-552	♦ QJ-884	UE64S	Contrast (Panel)
B	1Meg	½		R2-54				Volume (Rear)
C	Switch			KB-1				Attach to R1B.
R2A	2Meg	½	75C13-64	B-76	A47-2Meg-Z	Q13-139	U-55	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R2A.
R3A	100KΩ	½	75C13-62	B-40	A47-100K-S	Q11-128	U-41	Brightness
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R3A.
R4A	200KΩ	½	75C13-63	B-46	A47-200K-S	Q11-129	U-43	Vert. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R4A.
R5A	2.5Meg	½	75C20-1	BX-83	A47-2.5Meg-S	Q11-239	SU-565	Height
B	Shaft		Not Req.	Not Req.	FKS-¼	RQ	Not Req.	Attach to R5A.
R6A	3000Ω	½	75C20-7	AB-8	A47-3000-S	Q11-112	U-8	Vert. Linearity
B	Shaft		Not Req.	AK-1	FKS-¼	RQ	Not Req.	Attach to R6A.
R101A	2Meg	½	75B11-24	F1-71	RTV-473	* QJ-569	UF26L †	Tone (Panel)
B	1Meg	½		R2-56			UR16-T35 †	Volume tapped at 650K (Rear)

♦ Concentrikit Equivalent: K-7 Kit, Base Elements & Shafts; B17-108 & P17-300 (Panel)
B13-137 & R2-318 (Rear)
76-1 (Switch)

† Universal Replacement (Mallory Exact Duplicate Part No. UE1835).
* Concentrikit Equivalent: K-2 Kit, Base Elements & Shafts; B11-139 & P1-109 (Panel)
B19-137X & R2-127 (Rear)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ADMIRAL PART No.	IRC PART No.	NOTES
R7	680KΩ	½	60B8-684	BTS-680K	
R8	4700Ω	½	60B8-472	BTS-4700	
R9	820KΩ	½	60B8-824	BTS-820K	
R10	560KΩ	½	60B8-564	BTS-560K	
R11	220KΩ	½	60B8-224		
R12	10KΩ	½	60B8-103		
R13	10KΩ	½	60B8-103		
R14	8200Ω	½	60B8-822	BTS-8200	
R15	82KΩ	½	60B8-823	BTS-82K	
R16	3300Ω	2	60B20-332	BTB-3300	
R17	470Ω	½	60B8-471	BTS-470	
R18	1Meg	½	60B8-105	BTS-1Meg	
R19	15Meg	½	60B8-156	BTS-15Meg	
R20	820KΩ	½	60B8-824	BTS-820K	
R21	470KΩ	½	60B8-474	BTS-470K	
R22	270KΩ	½	60B8-274	BTS-270K	
R23	1000Ω	½	60B8-102	BTS-1000	Note 1
R24	1000Ω	½	60B8-102	BTS-1000	
R25	13KΩ 5%	½	60B7-133		
R26	1000Ω	½	60B8-102	BTS-1000	
R27	56Ω	½	60B8-560	BTS-56	
R38	220KΩ	½	60B8-224	BTS-220K	
R39	27KΩ	½	60B8-273	BTS-27K	
R30	220KΩ	½	60B8-224	BTS-220K	
R31	27KΩ	½	60B8-273	BTS-27K	
R32	10KΩ 5%	½	60B7-103		
R33	1000Ω	½	60B8-102	BTS-1000	
R34	47Ω	½	60B8-470	BTS-47	
R35	1000Ω	½	60B8-102	BTS-1000	
R36	1200Ω	½	60B8-122	BTS-1200	
R37	120Ω	½	60B8-121	BTS-120	
R38	2000Ω	7	61A1-33	PW7-2000	
R39	4700Ω	½	60B8-472	BTS-4700	
R40	100Ω	½	60B8-101	BTS-100	
R41	4700Ω	2	60B20-472	BTB-4700	
R42	15KΩ	½	60B8-153	BTS-15K	
R43	270KΩ	½	60B8-274	BTS-270K	
R44	30KΩ 5%	½	60B7-303	BTS-30K 5%	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ADMIRAL PART No.	IRC PART No.	NOTES
R45	1Meg	½	60B8-105	BTS-1Meg	
R46	180KΩ	½	60B8-184	BTS-180K	
R47	180Ω	½	60B8-181	BTS-180	
R48	470Ω	½	60B8-471	BTS-470	
R49	56KΩ	½	60B8-563	BTS-56K	
R50	2700Ω	½	60B8-272	BTS-2700	
R51	470KΩ	½	60B8-474	BTS-470K	
R52	1000Ω	½	60B8-102	BTS-1000	
R53	120Ω	½	60B8-121	BTS-120	
R54	390Ω	½	60B8-391	BTS-390	
R55A	10KΩ			BTS-10K	
B	10KΩ		† 63C6-15	BTS-10K	
C	47KΩ			BTS-47K	
R56	4.7Meg	½	60B8-475	BTS-4.7Meg	
R57	470Ω	½	60B8-471	BTS-470	
R58	27KΩ	1	60B14-273	BTA-27K	
R59	470KΩ	½	60B8-474	BTS-470K	
R60	2Meg 5%	½	60B7-205	BTS-2Meg 5%	
R61	100Ω	½	60B8-101	BTS-100	
R62	1.6Meg5%	½	60B7-165	BTS1.6Meg 5%	
R63	3Meg 5%	½	60B8-305	BTS-3Meg 5%	
R64	220Ω	2	60B20-221	BTB-220	
R65	2.2Meg	½	60B8-225	BTS-2.2Meg	
R66	220KΩ	½	60B8-224	BTS-220K	
R67	47KΩ	½	60B8-473	BTS-47K	
R68	2.2Meg	½	60B8-225	BTS-2.2Meg	
R69	4.7Meg	½	60B8-475	BTS-4.7Meg	
R70	6800Ω	½	60B8-682	BTS-6800	
R71	3300Ω	½	60B8-332	BTS-3300	
R72	3300Ω	½	60B8-332	BTS-3300	
R73	220KΩ	½	60B8-224	BTS-220K	
R74	1.8Meg	½	60B8-185	BTS-1.8Meg	
R75	15KΩ	½	60B8-153	BTS-15K	
R76	150KΩ	½	60B8-154	BTS-150K	Note 2
R77	1.5Meg	½		BTS-1.5Meg	Note 3
R78	100KΩ	½	60B8-104	BTS-100K	
R79	220KΩ	½	60B8-224	BTS-220K	
R80	820Ω	½	60B8-821	BTS-820	

PARTS LIST AND DESC

RESISTO

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ADMIRAL PART No.	IRC PART No.	NOTES
R81	560Ω	½			
R82	560Ω -	½			
R83	100KΩ 5%	½	60B7-104		
R84	100KΩ 5%	½	60B7-104		
R85	82KΩ	½	60B8-823		
R86	470KΩ	½	60B8-474		
R87	4.7Meg	½	60B7-475		
R88	5600Ω	½	60B8-562		
R89	1500Ω	½	60B8-152		
R90	150KΩ	½	60B8-154		
R91	3900Ω	½	60B8-392		
R92	100Ω	½	60B8-101		
R93	470KΩ	½	60B8-474		
R94	100Ω	½	60B8-101		
R95	1000Ω	½	60B8-102		
R96	5600Ω	2	60B20-472	BTB-5600	Note 4

Note 1. Used in later production models.
Note 2. Some versions use a 120KΩ ½W resistor
Note 3. Some versions use a 2.2Meg ½W resistor
Note 4. Some versions use a 4700Ω 2W resistor 2W resistors wired in parallel are used.
Note 5. Not used in some versions.
† Items R55A, R55B, R55C, C51A, C51B, C51C

TRANSFORMER

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	ADMIRAL PART No.
T1	117VAC	540VCT	5V	6.3V	80C35-2
	② 1.5A	③ .200A	③ 3A	③ 10A	

① Parallel and phase 6.3V windings.
② Tape high HV winding.
③ Tape 5V winding.
④ Parallel and phase 6.3V ③ 6A windings.
⑤ Tape 6.3V ③ 1.2A winding.

TRANSFORMERS (SW

ITEM No.	USE	ADMIRAL PART No.	Halldorson PART No.	Merit PART No.
T2	Horiz. Output Trans.	79D65-1	FB420 *	
T3	Vert. Output Trans.	79B43-4	Z1900 ①	A-2824 ② ③
T4A	Yoke(90°) Horiz. (18.5MH)	94D87-10 ⑤	DF607 ⑦	MDF-92 ⑦
B	Vert. (37MH)	94D87-8 ⑤ ⑥		

① Use 15 to 1 turns ratio.
② Drill new mounting hole(s).
③ Cut and tape yellow lead.
④ Connect as auto transformer.
⑤ Includes resistors R81 and R82 and plug Admiral Part No. 8
⑥ Alternate deflection yoke.
⑦ Use original horizontal damping network.

*HORIZONTAL OUTPUT TRANS

Use Original Width Coil Unless

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacemen Connection
	5	5		
	6	2		
	8	1		
Special Notes →		⑧		

⑧ Filament winding requires 2 turns.

TRANSFORMER (AU

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Stan PART
T5	2.5KΩ	3-4Ω	Part of Speaker 78C109-1	Z1001	A3025	A38

SPEAKE

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DA ADMIRAL PART No.	QUAM PART No.
SP1	4"x 6"	PM	3-4Ω	78C109-1 ①	46A1
	4"x 6"	PM	3-4Ω	78C109-2 ②	46A1

COILS (R

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	ADMIRAL PART No.	MEISS PART
L1	Ant. Matching Trans.	0Ω	0Ω		
L2	Ant. Matching Trans.	0Ω	0Ω		
L3	IF Trap	0Ω		94D92-67	
L4A	Ant., RF Mixer Grid, Osc. Coils	0Ω		94D92-52	
B	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D92-53	
C	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D92-54	

ued)

NT DATA IRC PART No.	NOTES
W½-4.7	
BTA-1000	
BTS-22K	
BTB-12K	
BTS-100K	
BTS-150	
BTS-47K	
BTS-1Meg	
BTS-4.7Meg	
BTS-82K	
BTS-470K	Note 5
BTS-560K	Note 5
BTS-680K	Note 5

5).
her, two 18KΩ

ordarson ART No.	Triad PART No.
R33 ① ② ③	R-62BC ④ ⑤

ordarson ART No.	Triad PART No.
LY-77 *	D-49 *
6S54	A-109X ④
-16 ⑦	Y-41-1 ⑦

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ADMIRAL PART No.	MEISSNER PART No.	MERIT PART No.	M PA
D	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D92-55			
E	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D92-56			
F	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D92-57			
G	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D92-58			
H	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D92-59			
I	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D92-60			
J	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D92-61			
K	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D92-62			
L	Ant., RF, Mixer Grid, Osc. Coils	0Ω		94D92-63			
L5	Fil. Choke	0Ω					
L6	Neut. Coil	0Ω		94D92-68			
L7	RF Coil	0Ω		94D92-69			
L8	Conv. Plate	.7Ω		94D92-64			
L9A	27.25MC Trap			72C132-5			
B	1st. Sound IF	.1Ω		72C132-6			
L10	2nd. Video IF	.4Ω	.4Ω	72C132-4			
L11	21.25MC Trap	0Ω		72C132-3			
L12	3rd. Video IF	.4Ω	.4Ω	72C132-2			
L13	4th. Video IF	.7Ω	.3Ω	72B152-2			
L14	Series Peaking Coil	2.9Ω		73A24-2	19-3036	TV-180	
L15	Series Peaking Coil	5.3Ω		73B5-26	19-3180 *	TV-184 *	
L16	Shunt Peaking Coil	16Ω		73B5-25	19-3500		
L17	4.5MC Trap	4.7Ω		72C132-1			
L18	Series Peaking Coil	6Ω		73B5-14	19-3250■	TV-185■	
L19	Shunt Peaking Coil	22Ω		73A11-1			
L20	Sound IF	4.7Ω		72C132-1			
L21	Ratio Det.	3.6Ω	.3Ω CT	72C68-2	17-1033	TV-110	
L23	Ant. Coil	.5Ω		69B207-1			
L24	Osc. Coil	6.5Ω		69A52-11			
L25	Input IF	17Ω	17Ω	72C28-7	16-6758	BC-352	
L26	Output IF	17Ω	17Ω	72C28-7	16-6758	BC-353	

* Parallel With 4.7KΩ Resistor.
■ Parallel With 18KΩ Resistor.
▲ Parallel With 10KΩ Resistor.

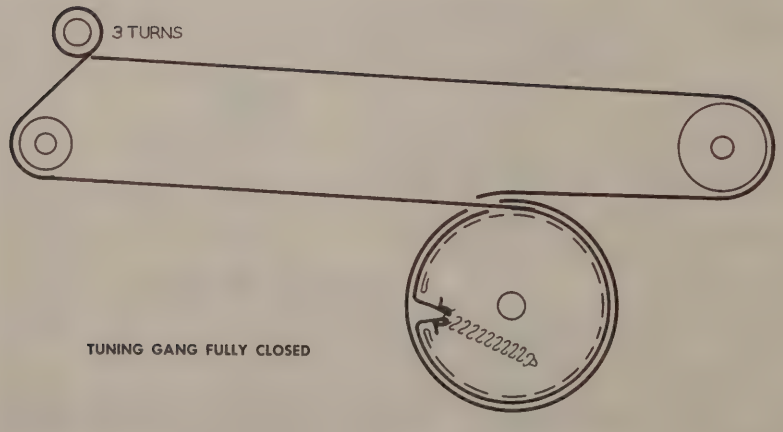
TRANSFORMER (HORIZ. OSC

PARTS LIST AND DESCRIPTIONS (Continued)

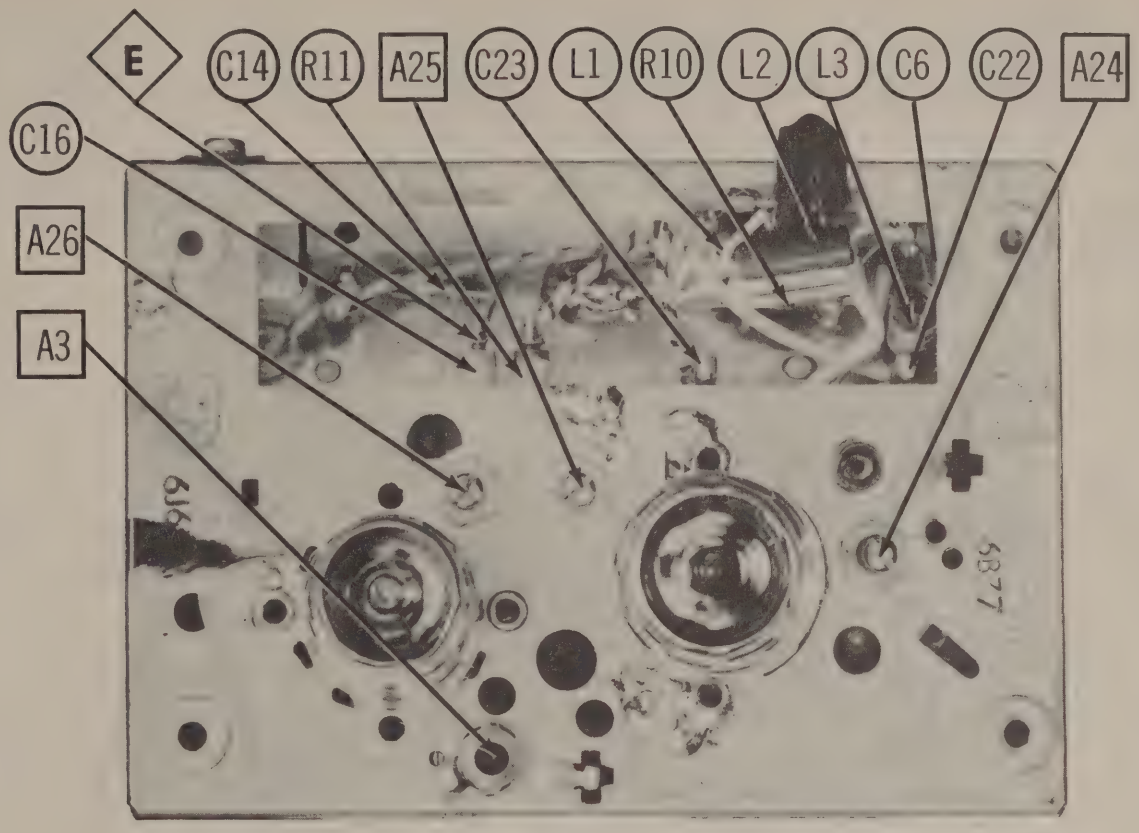
MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M4	Dial Light	81A1-12	#51
M5	Tuner	94D92-8	VHF
M6	Switch	76A31-2†	Local-Distant (DPDT-Rotary, Wafer Type) Mounts On Front Of Set.
M7	Integrator	63C9-1	Vertical - Centralab Part #PCT-104; Sprague Part #103C12.
M8	Printed Circuit Board	A4861-4	Video IF
M9	Printed Circuit Board	A4864-2	Sync
M10	Centering Device	94A71-1	
M11	Ion Trap	94A15-4	
M12	Dial Light	81A1-8	#47
M13	Dial Light	81A1-8	#47
M14	Tuning Cap.	68B65 *	2 Gang (11-50MMF; 18-125MMF).
M15	Switch	77B49	Selector (Rotary, Wafer Type).
	Trimmer Cap.	66A33-1	Ant. Trimmer (2.5-30MMF).
	Trimmer Cap.	66A30-3	Horiz. Drive (170-780MMF).
	Cabinet	35E350-2	Model K23A6
	Cabinet	35E350-3	Model K23A7
	Knob	33D165-11	Contrast
	Knob	33D165-10	Fine Tuning
	Knob	33A171-2	Local-Distant
	Knob	33D165-15	On-Off-Volume (Maroon With Gold Trim).
	Knob	33D165-93	On-Off-Volume (Beige With Gold Trim).
	Knob	33D165-117	On-Off-Volume (Green With Gold Trim).
	Knob	33D165-14	VHF Channel Selector (Maroon With Gold Trim).
	Knob	33D165-92	VHF Channel Selector (Beige With Gold Trim).
	Knob	33D165-116	VHF Channel Selector (Green With Gold Trim).
	Mask	23E220-5	Model K23A6.
	Mask	23E220-2	Model K23A7.
	Safety Glass	21C83-2	
	Knob	33D111-1	Tone (Radio)
	Knob	33D111-2	Tuning (Radio)
	Knob	33D111-14	Selector (Radio)
	Knob	33D111-13	Volume (Radio)
	Dial Pointer	25A1-5	Radio
	Dial Scale	22B32	Radio

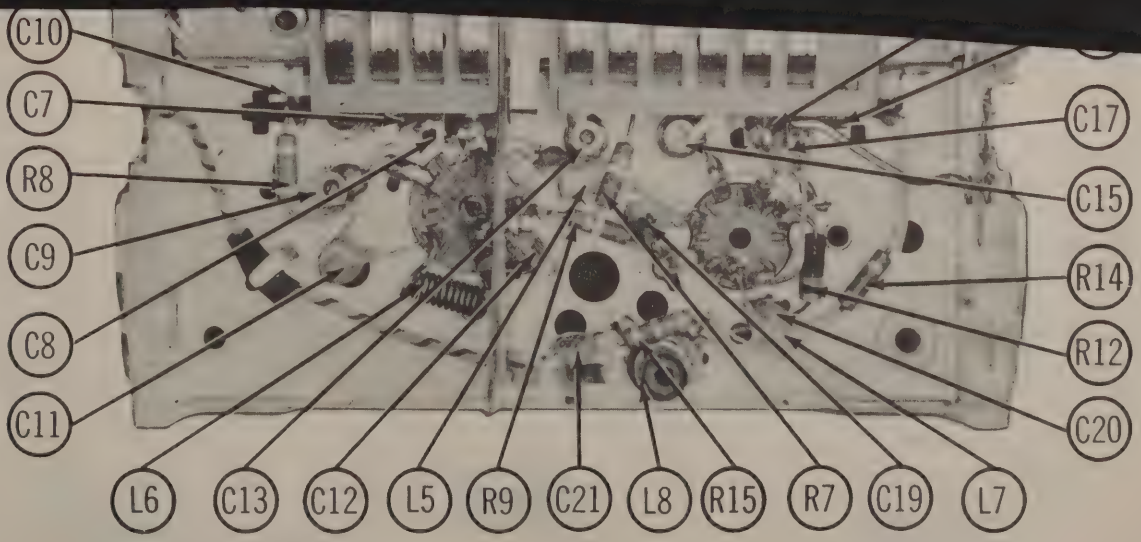
† Alternate Part #76A31-1 (Mounts On Side Of Set.)
* Alternate part #68B32.



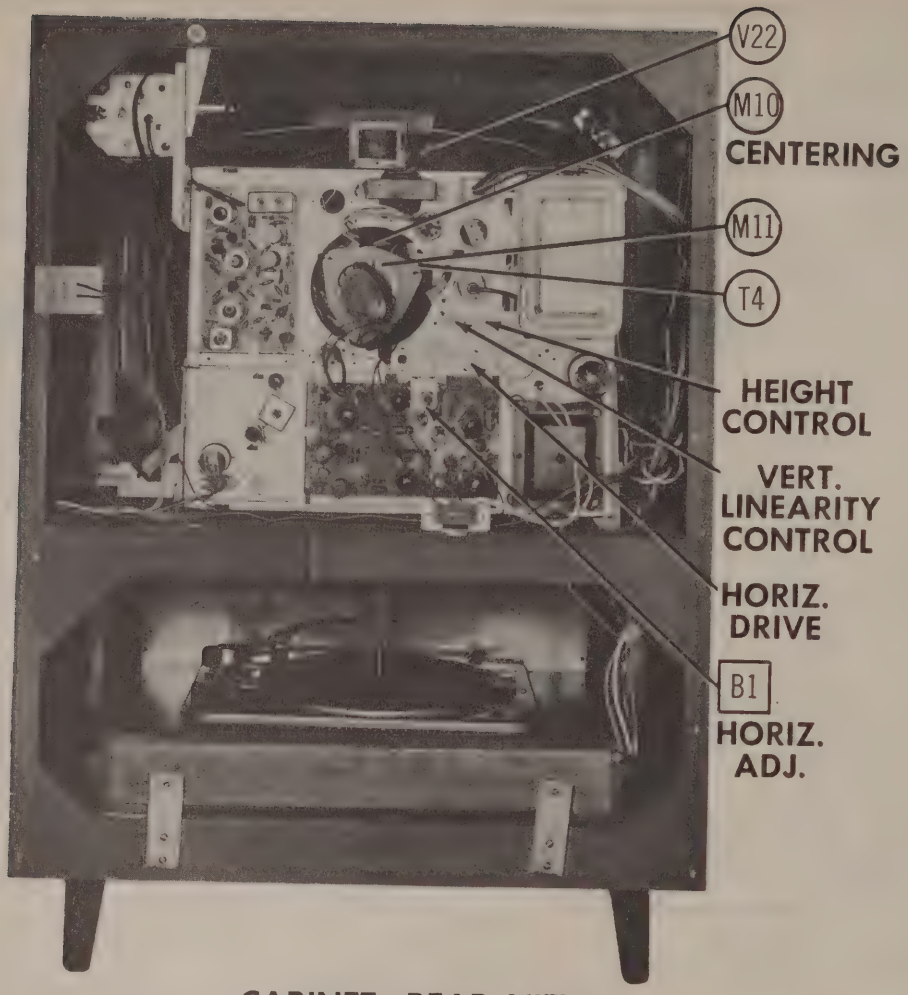
RADIO DRIVE CORD STRINGING



RF TUNER-TOP VIEW

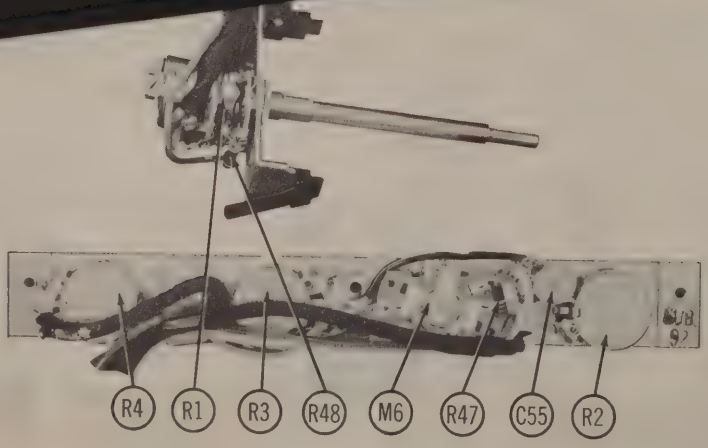


RF TUNER-BOTTOM VIEW



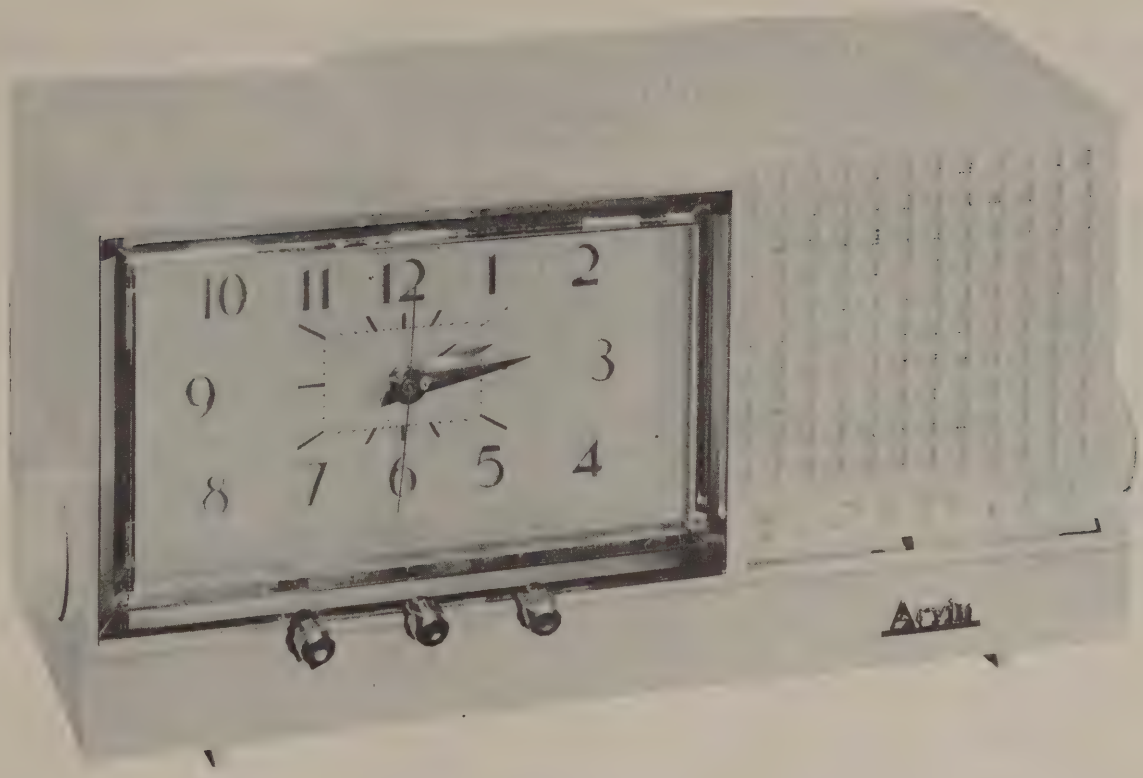
CABINET—REAR VIEW

HORIZONTAL SWEEP CIR



CONTROL ASSEMBLY

ARVIN MODEL
957T (Ch. RE393)



ARVIN MODEL
957T (Ch. RE393)

TRADE NAME	Arvin Model 957T (Ch. RE393)
MANUFACTURER	Arvin Industries Inc., Columbus, Indiana
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC - 60 Cycles
RATING	.27 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC - 1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ mod)	Tuning gang fully open.	Across voice coil.	A1, A2 A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop (radiated).	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1000KC	Tune to 1000KC signal.	"	A6	"

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G377

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		ARVIN PART No.	STANDARD REPLACEMENT	
V1	Converter	12BE6	12BE6	
V2	IF Amplifier	12BA6	12BA6	
V3	Det. -AVC-AF Amplifier	12AV6	12AV6	
V4	Output	50C5	50C5	
V5	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	150		PRS150V4080	BBRD8415	TCT3116	TDL-8040-150	MTD-1550	TVA-2453
B	40	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	200		BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
3A	220									
B	5000									
C	5000		♦	♦PA-113-2	♦PC-151	♦116TM2	♦1408-02		♦DT-2	
D	250									
E										
C4	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C5	15000			BPD-015	DD16-153	CUB6S15	817-015	PT6115	6TM-S15	
C6	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C7	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

♦ Items C3A, C3B, C3C, C3D, C3E, R4A, R4B and R4C are combined in one unit. When replacing items separately, C3D and C3E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ARVIN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	C43483	B-70	A47-1Meg-Z	B-70	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ARVIN PART No.	IRC PART No.	
R2	22KΩ	½		BTS-22K	
R3	3.3Meg	½		BTS-3.3Meg	
R4A	6.8Meg			BTS-6.8Meg	
B	470KΩ		♦	BTS-470K	
C	470KΩ			BTS-470K	

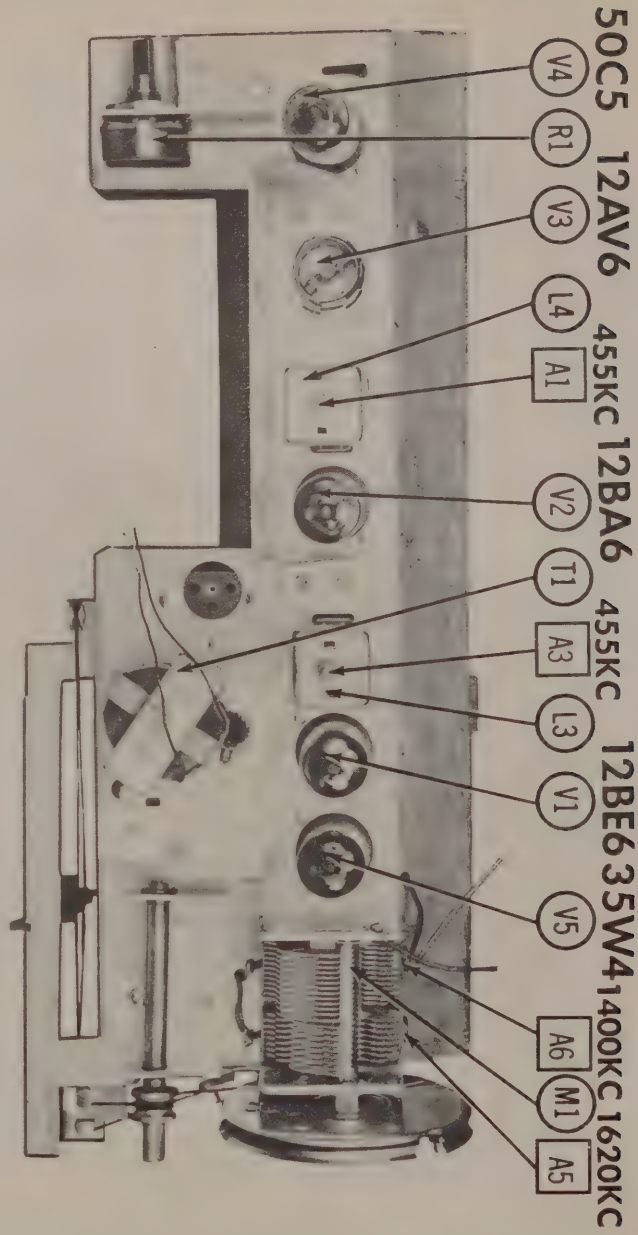
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ARVIN PART No.	IRC PART No.	
R5	100KΩ	½		BTS-100K	
R6	12KΩ	1		BTA-12K	
R7	100Ω	½		BTS-100	
R8	1000Ω	1		BTA-1000	
R9	330KΩ	½		BTS-330K	

♦ Items R4A, R4B, R4C, C3A, C3B, C3C, C3D, C3E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ARVIN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.6KΩ	3-4Ω	42700-9	Z1101	A-3025	A3332	26S58	S-12X	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

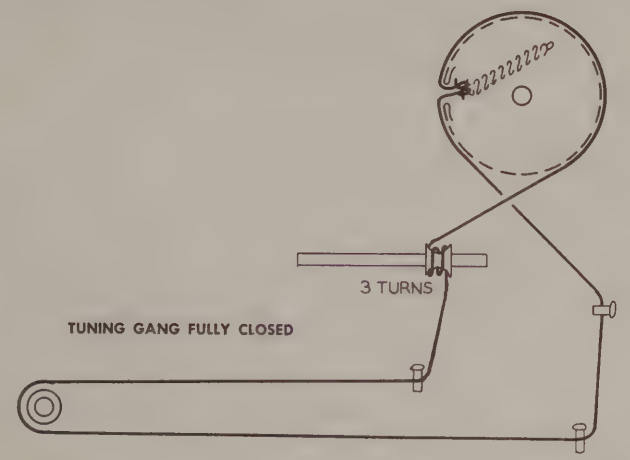
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ARVIN PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5"	PM	3-4Ω	C25756	5A07	205S2	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ARVIN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.5Ω		43505-1				
L2	Osc. Coil	.7Ω	8Ω					
L3	Input IF	14Ω	14Ω	43412-1				
L4	Output IF	14Ω	14Ω	43412-1				

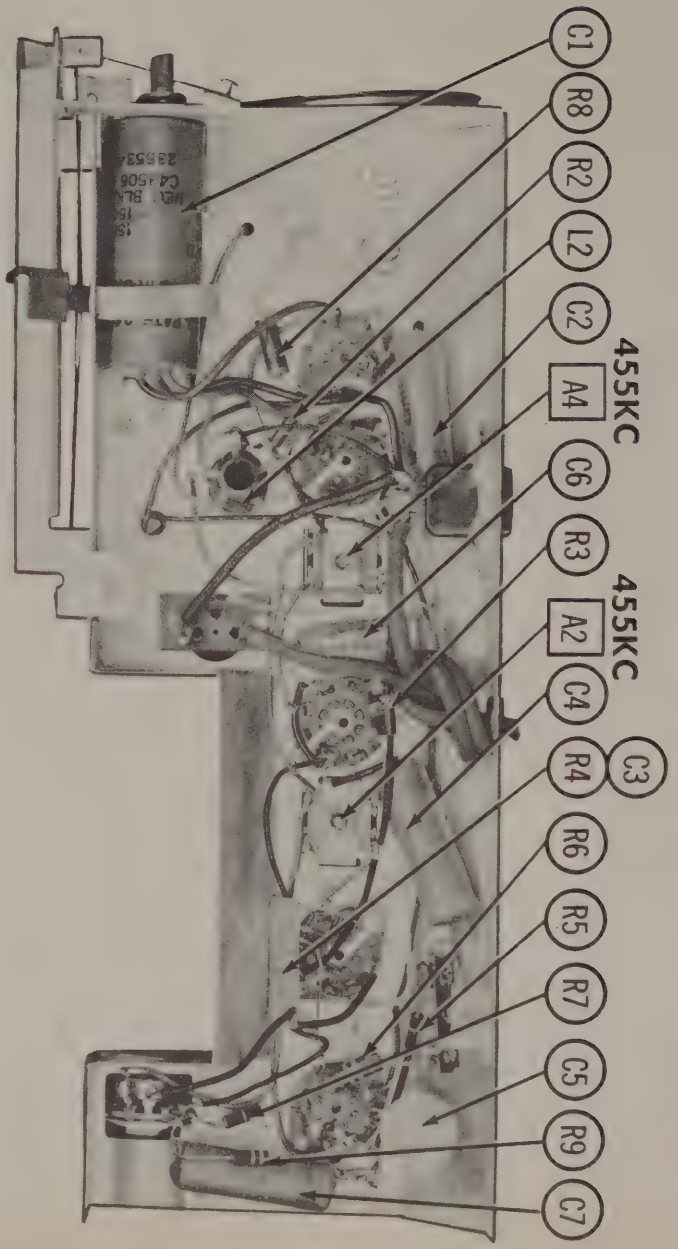
MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
M1	Tuning Cap.	C-43479	2 Gang (16-360MMF, 12-115MMF).

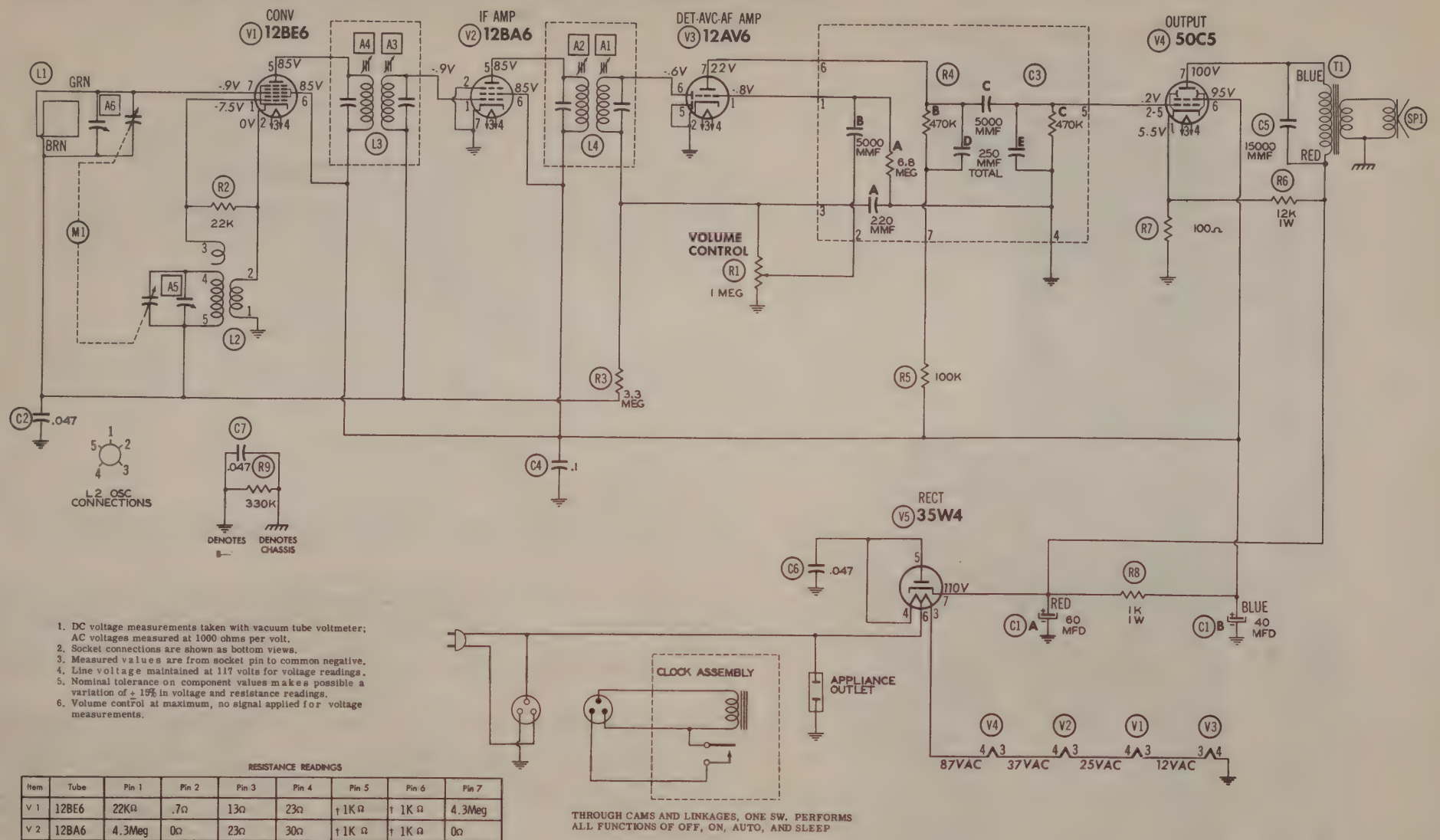


DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



ARVIN
MODEL 957T (Ch. RE393)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.7Ω	13Ω	23Ω	† 1KΩ	† 1KΩ	4.3Meg
V 2	12BA6	4.3Meg	0Ω	23Ω	30Ω	† 1KΩ	† 1KΩ	0Ω
V 3	12AV6	6.8Meg	0Ω	13Ω	0Ω	0Ω	1Meg	† 570KΩ
V 4	50C5	100Ω	470KΩ	30Ω	33Ω	470KΩ	† 1KΩ	† 190Ω
V 5	35W4	NC	TP	85Ω	120Ω	120Ω	115Ω	12KΩ

† - MEASURED FROM PIN 7 OF V5.
NC - NO CONNECTION.
TP-TIE POINT.
ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED.

THROUGH CAMS AND LINKAGES, ONE SW. PERFORMS ALL FUNCTIONS OF OFF, ON, AUTO, AND SLEEP

IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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CBS-COLUMBIA MODELS 5C603, 5C604 (Ch. 1621)

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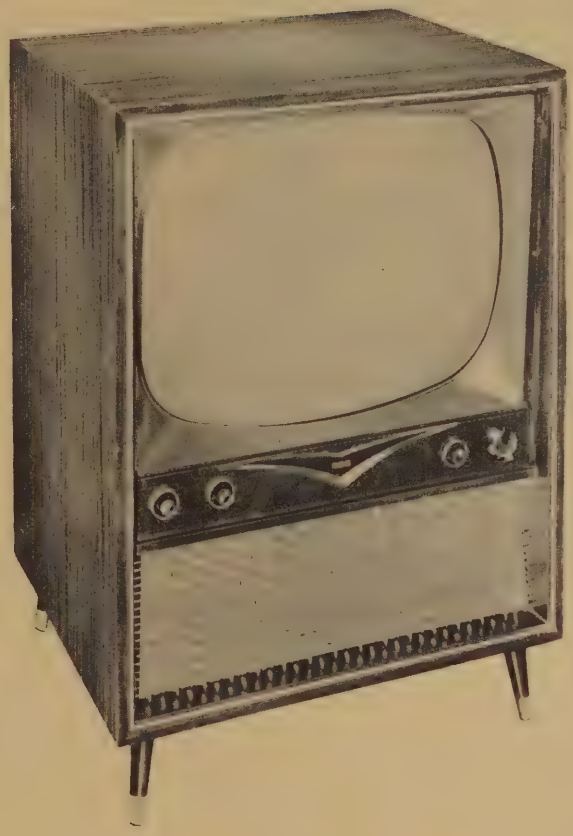

CBS-COLUMBIA MODEL 5C603

TRADE NAME	CBS-Columbia Models 5C603, 5C604 (Ch. 1621)
MANUFACTURER	CBS-Columbia, A Division of Columbia Broadcasting System, Inc., 48-50 34th. St., Long Island City, N.Y.
TYPE SET	Television Receiver
TUBES	Seventeen
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.29 Amp. @ 117 Volts AC
TUNING RANGE-	Channels 2 thru 13, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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CBS-COLUMBIA MODELS 5C603, 5C604 (Ch. 1621)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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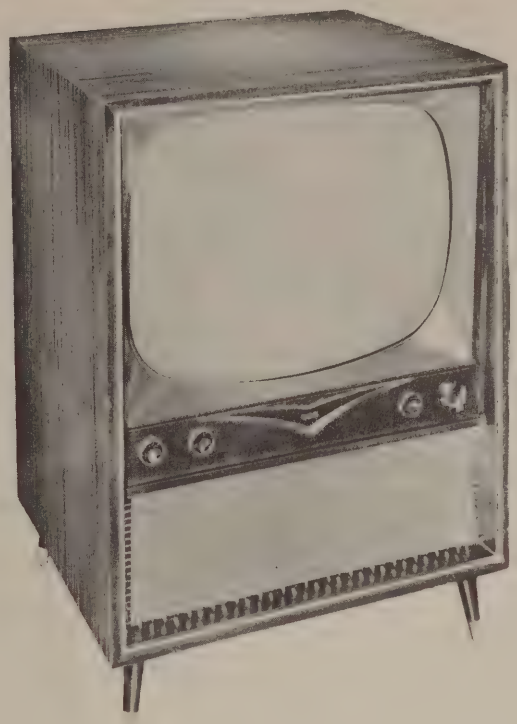

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 6 push-on type control knobs from front panel of cabinet.

2. Remove 6 wood screws. Remove rear cover.

3. Remove picture tube socket, speaker plug, yoke plug, HV lead, picture tube assembly ground strap and 2 pilot light plugs.

4. Remove 6 chassis bolts. Remove chassis.

5. Remove 2 speaker nuts. Remove speaker.

NOTE: If it is necessary to remove the chassis for servicing it is also necessary to remove the speaker. The filter choke and the audio output transformer is mounted on the speaker and must be connected for proper operation.

MODEL	CHASSIS
5C603, 5C604	1621

CBS-COLUMBIA MODELS
5C603, 5C604 (Ch. 1621)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet above and slightly to the left of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 10 wood screws holding 3 wood molding strips at the sides and top edges of the safety glass. Remove molding strips and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 15.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to the set. Adjustment is located on the top side of the chassis. Set the horizontal hold control to the center of its range and adjust the horizontal frequency slug (L28) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the buzz control (R7) located on the top side of the chassis for maximum sound and minimum buzz.

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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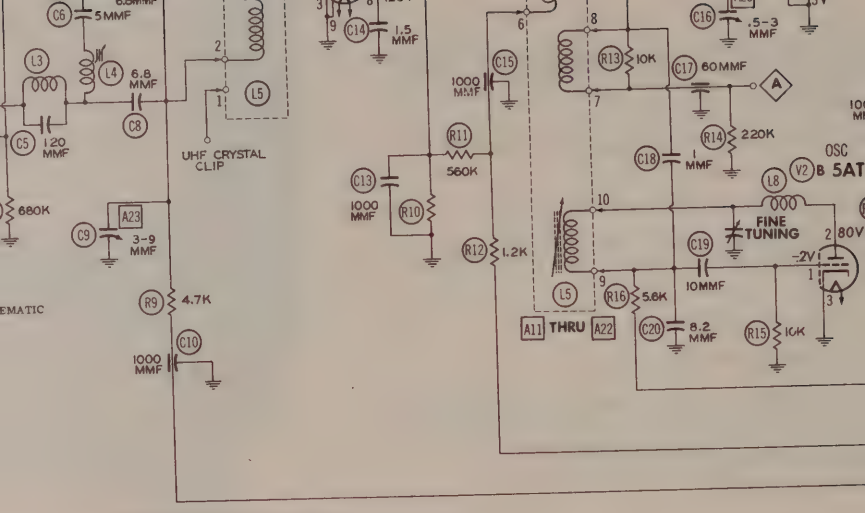

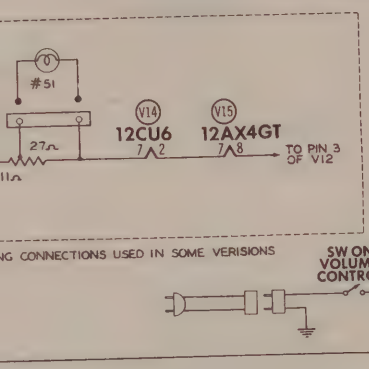

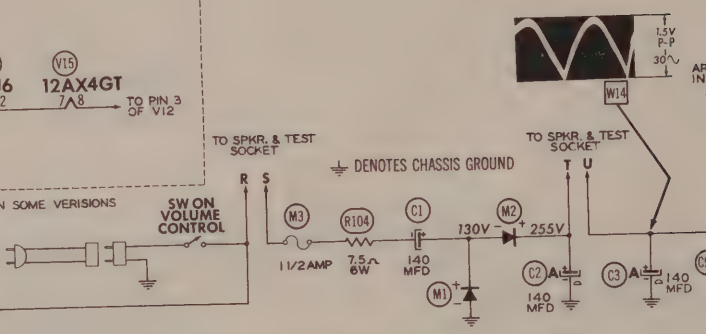

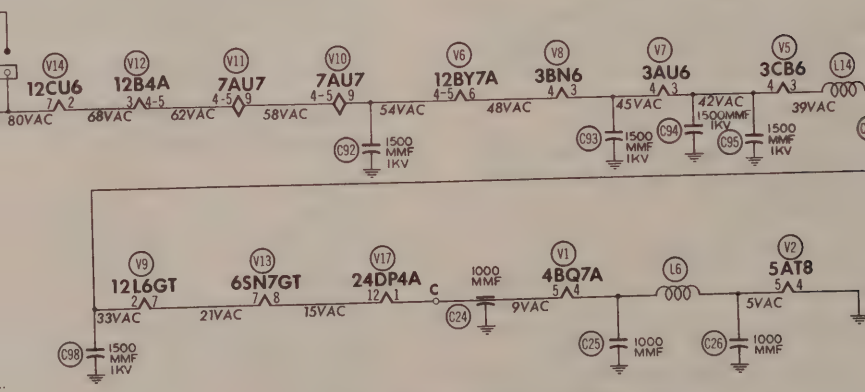

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

NATE

UNDER ONE OHM NOT M. (SEE PARTS LIST)

TE CLOCKWISE ROTATION M SHAFT END)

NTROLS AK-TO- BE

taken with vacuum tube
easured at 1,000 ohms

n a clockwise direction

3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage-readings.
5. All controls set for normal operation; no signal applied.

A PHOTOFACT STAN
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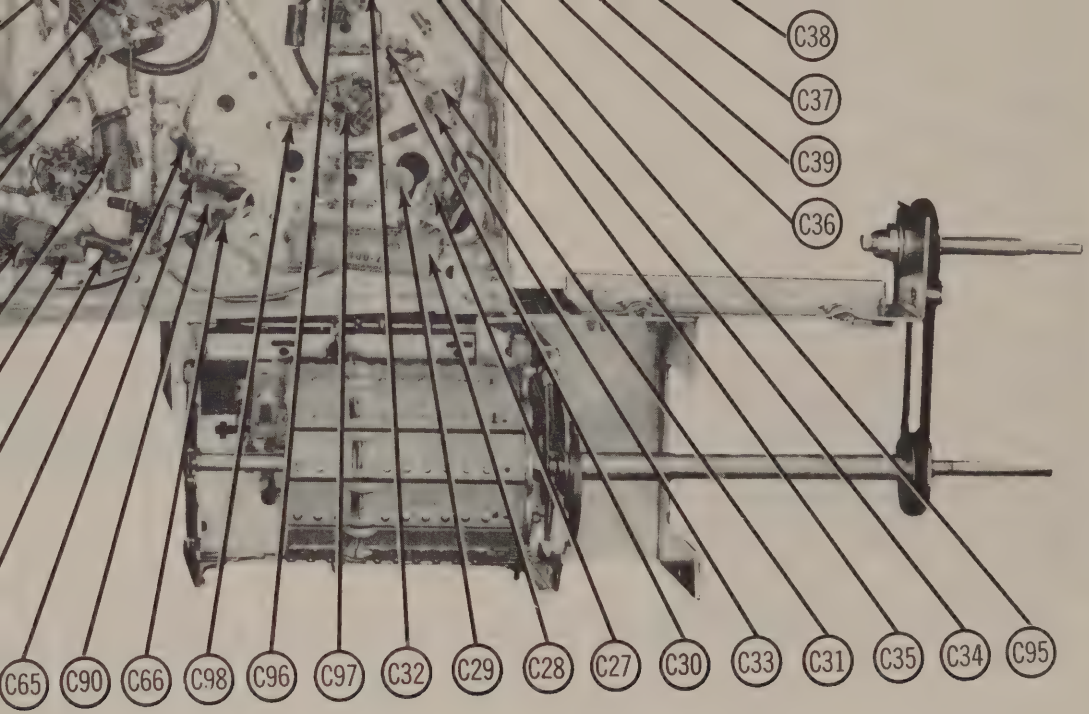
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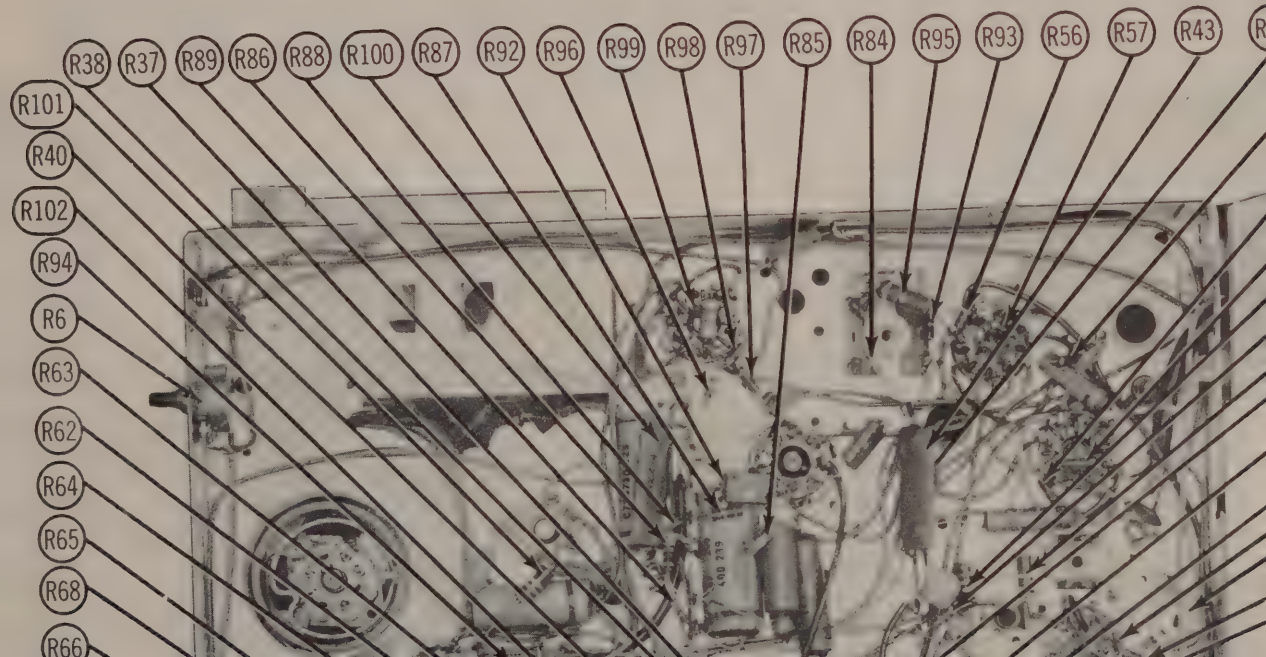
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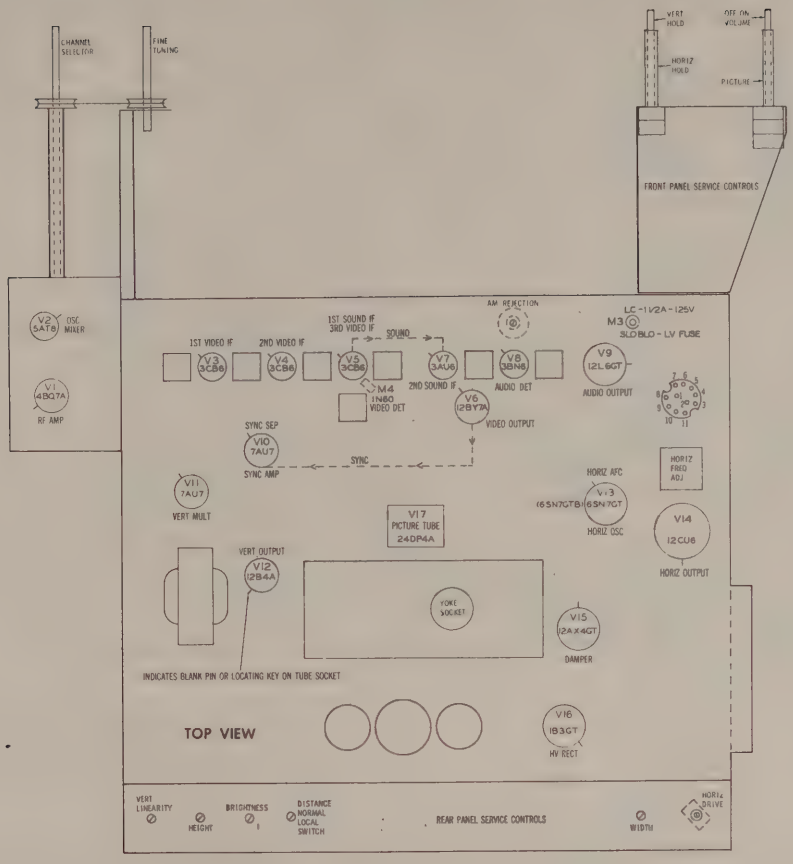
R66

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

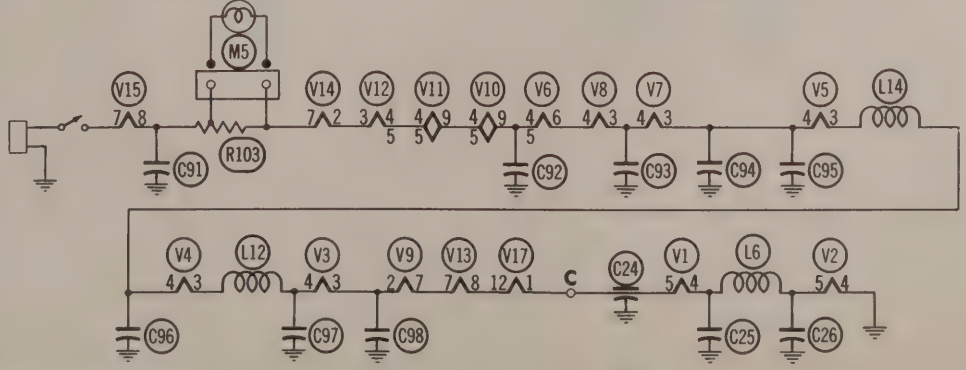
POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2), Fuse (M3)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V9**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V17**
Has pic, no sound - **V5, V7, V8, V9**

SYNC FAILURE
No vert. sync - **V10, V11**
No horiz. sync - **V10, V13**
No vert. or horiz. sync - **V10**

SWEEP FAILURE
No raster, has sound - **V13, V14, V15, V16, V17**
No vertical deflection - **V11, V12**
Poor vert. linearity or foldover - **V11, V12**
Poor horiz. linearity or foldover - **V13, V14, V15**
Narrow picture - **V13, V14, V15, V16, M1, M2**
Vert. off freq. - **V10, V11**
Horiz. off freq. - **V10, V13**

NOTE : Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See circuit below).



SET 321 FOLDER 3

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by disconnecting the ground lead from the cathode (pin 8) of the 12CU6 horizontal output tube.

VIDEO IF ALIGNMENT

Set local-distant switch to normal position.
Connect the negative lead of a 3 volt bias supply to the ungrounded side of C42. Positive lead to chassis.
Use lowest possible range of VTVM for all steps.
Remove channel 13 oscillator strip from tuner.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 of V3. Low side to chassis.	42.7MC	13	DC probe to pin 8 of test socket. Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	41.25MC	"	"	A2	Adjust for MINIMUM deflection.
3.	"	"	45.5MC	"	"	A3	Adjust for maximum deflection.
4.	"	"	44.2MC	"	"	A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Attenuate sweep generator output to maintain 3 volt peak to peak vertical deflection on the scope.
Leave bias connect to the ungrounded side of C42.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Direct	High side to ungrounded tube shield floating over osc.-mixer tube. Low side to chassis.	43MC (10MC Swp.)	42.45MC 45.75MC	13	Vert. amp. to pin 8 of test socket. Low side to chassis.	A5, A6	Adjust to place markers in position as in Fig. 1. If necessary, retouch A1, A3, and A4 for correct response as in Fig. 1.

SOUND IF ALIGNMENT

Increase bias supply to 6 volts and set the local-distant switch to local position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to junction of L18 and L19. Low side to chassis.	4.5MC (400% AM 30% Mod.)	13	Across audio output transformer secondary.	A7, A8, A9	Adjust for maximum deflection.
7.	"	"	4.5MC (25KC FM)	"	"	A10	Set volume control to approximate center. Adjust A10 for maximum deflection on meter.
8.	"	"	4.5MC (400% AM 30% Mod.)	"	"	R7	Adjust for MINIMUM deflection. Repeat step 7.

ALTERNATE SOUND IF ALIGNMENT USING ON THE AIR TV SIGNAL

1. Tune the receiver to a strong TV signal and adjust controls for best picture. Set AM Rejection Control" at the center of its range. Attenuate signal (remove antenna and/or set local-distant switch to local position) until a hiss is heard in the sound. Adjust A7, A8, and A9 for maximum sound.
2. Increase signal level to normal and adjust A10 for maximum sound and minimum buzz.
3. Attenuate signal again and adjust buzz control (R7) for minimum hiss and noise.
4. Increase signal level to normal and rotate the fine tuning control. If buzz is still present, readjust A10 for clearest sound and minimum buzz.

OSCILLATOR ALIGNMENT

Replace channel 13 oscillator strip in tuner.
The oscillator adjustment screws are accessible thru a hole just to the left of the channel selector shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp.)	211.25MC 215.75MC	13	Vert. amp. to pin 8 of test socket. Common to chassis.	A11	Adjust to place sound marker in trap notch and video marker at 50% on response curve as in Fig. 2.
			207MC (10MC Swp.)	205.25MC 209.75MC	12		A12	
			201MC (10MC Swp.)	199.25MC 203.75MC	11		A13	
			195MC (10MC Swp.)	193.25MC 197.75MC	10		A14	
			185MC (10MC Swp.)	187.25MC 191.75MC	9		A15	
			183MC (10MC Swp.)	181.25MC 185.75MC	8		A16	
			177MC (10MC Swp.)	175.25MC 179.75MC	7		A17	
			85MC (10MC Swp.)	83.25MC 87.75MC	6		A18	
			79MC (10MC Swp.)	77.25MC 81.75MC	5		A19	
			69MC (10MC Swp.)	67.25MC 71.75MC	4		A20	
			63MC (10MC Swp.)	61.25MC 65.75MC	3		A21	
			57MC (10MC Swp.)	55.25MC 59.75MC	2		A22	

ALIGNMENT INSTRUCTIONS (cont)

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C42. The positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp.)	205. 25MC 209. 75MC	12	Vert. amp. thru 22KΩ to point (A). Low side to chassis.	A23, A24, A25	Adjust for response similar to Fig. 2 with markers above 90%.
11.	"	"	213MC (10MC Swp.)	211. 25MC 215. 75MC	13	"		Check for response similar to Fig. 2. If marker falls below 70% on any channel, make SLIGHT compromise adjustment of A23, A24, and A25 with channel selector set at that channel. Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11			
			195MC (10MC Swp.)	193. 25MC 197. 75MC	10			
			185MC (10MC Swp.)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5			
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4			
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2			

UHF TUNER ALIGNMENT

The UHF tuner portion of this receiver has been properly aligned at the factory and is very stable. Alignment of the UHF portion is not recommended in the field.

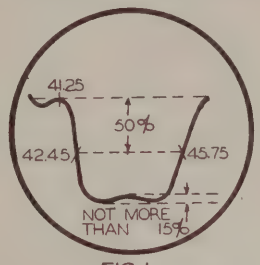


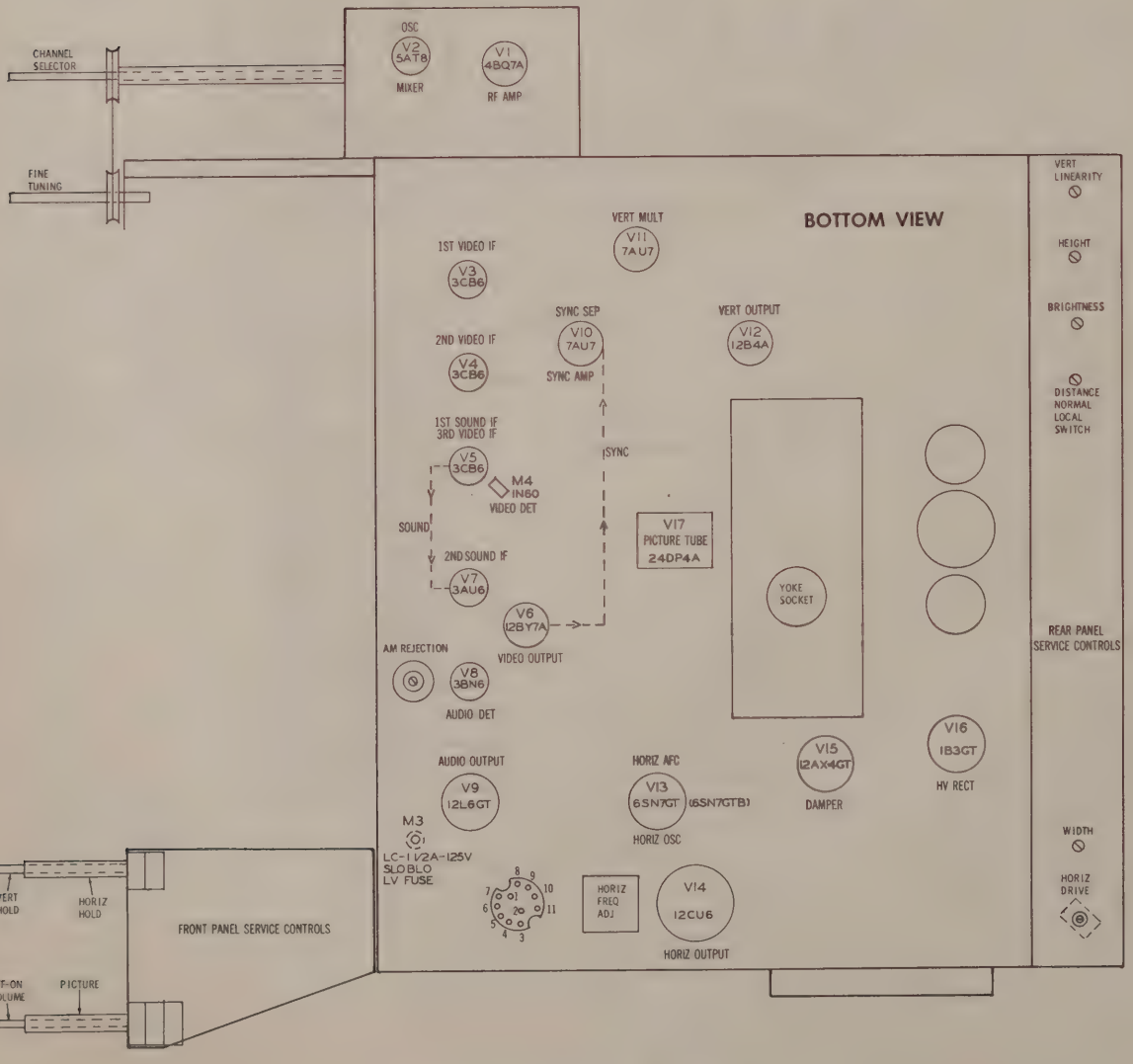
FIG. 1

FIG. 2

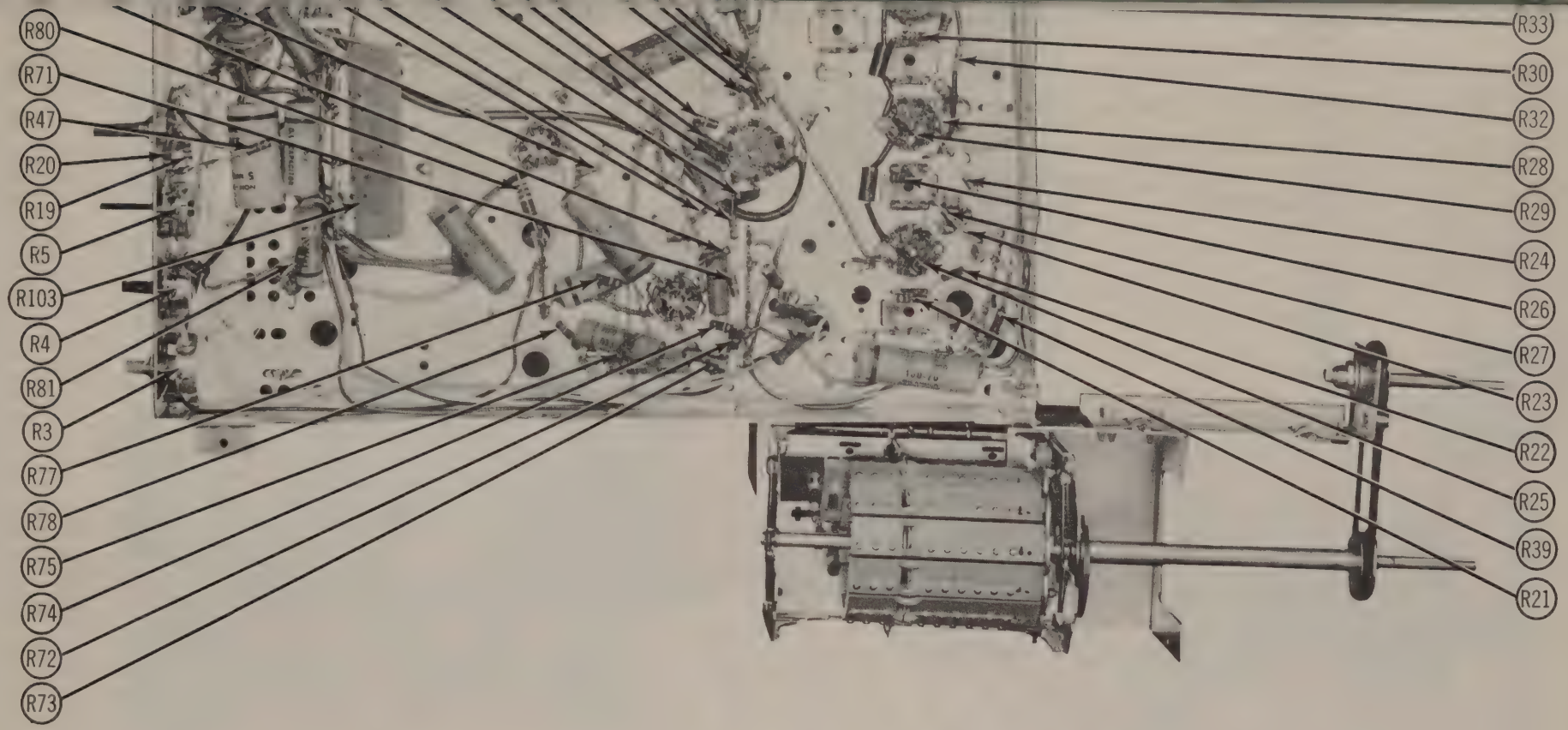
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	4BQ7A	INF	800KΩ	0Ω	1Ω	2Ω	† 1.2KΩ	350KΩ	INF	0Ω
V 2	5AT8	10KΩ	■ 6KΩ	0Ω	0Ω	1Ω	■ 1.3KΩ	■ 47KΩ	0Ω	220KΩ
V 3	3CB6	1Meg	47Ω	7Ω	8Ω	■ 700Ω	■ 700Ω	0Ω		
V 4	3CB6	1Meg	47Ω	8Ω	9Ω	■ 330Ω	■ 330Ω	0Ω		
V 5	3CB6	1KΩ	180Ω	9Ω	10Ω	† 5.6KΩ	■ 1KΩ	0Ω		
V 6	12BY7A	90Ω	1Meg	0Ω	13Ω	13Ω	12Ω	† 5KΩ	† 27KΩ	0Ω
V 7	3AU6	100KΩ	0Ω	10Ω	11Ω	■ 10KΩ	■ 10KΩ	120Ω		
V 8	3BN6	300Ω	2.9Ω	11Ω	12Ω	■ 3.9KΩ	3.6Ω	† 350KΩ		
V 9	12L6GT	TP	7Ω	† 300Ω	† 49Ω	440KΩ	TP	5Ω	17KΩ	
V 10	7AU7	■ 900Ω	500KΩ	1KΩ	14Ω	14Ω	■ 70KΩ	2.5Meg	0Ω	13Ω
V 11	7AU7	† 150KΩ	100KΩ	680Ω	15Ω	15Ω	† 2.5Meg	3Meg	680Ω	14Ω
V 12	12B4A	1.2KΩ	2.2Meg	16Ω	15Ω	15Ω	NC	2.2Meg	NC	† 370Ω
V 13	6SN7GT	1.5Meg	† 30KΩ	400KΩ	480KΩ	† 47KΩ	0Ω	5Ω	3Ω	
V 14	12CU6	TP	16Ω	TP	† 9KΩ	1Meg	TP	17Ω	0Ω	TOP CAP ▲ 15Ω
V 15	12AX4GT	TP	NC	400KΩ	NC	† 50Ω	NC	48Ω	46Ω	
V 16	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 665Ω
V 17	24DP4A	2Ω	22KΩ	PIN 6 17KΩ	PIN 10 ▲ 68KΩ	PIN 11 ■ 150KΩ	PIN 12 3Ω			

† MEASURED FROM POSITIVE SIDE OF C2A.
■ MEASURED FROM 130V LINE.
▲ MEASURED FROM PIN 3 OF V15.
TP-TIE POINT.
NC-NO CONNECTION.



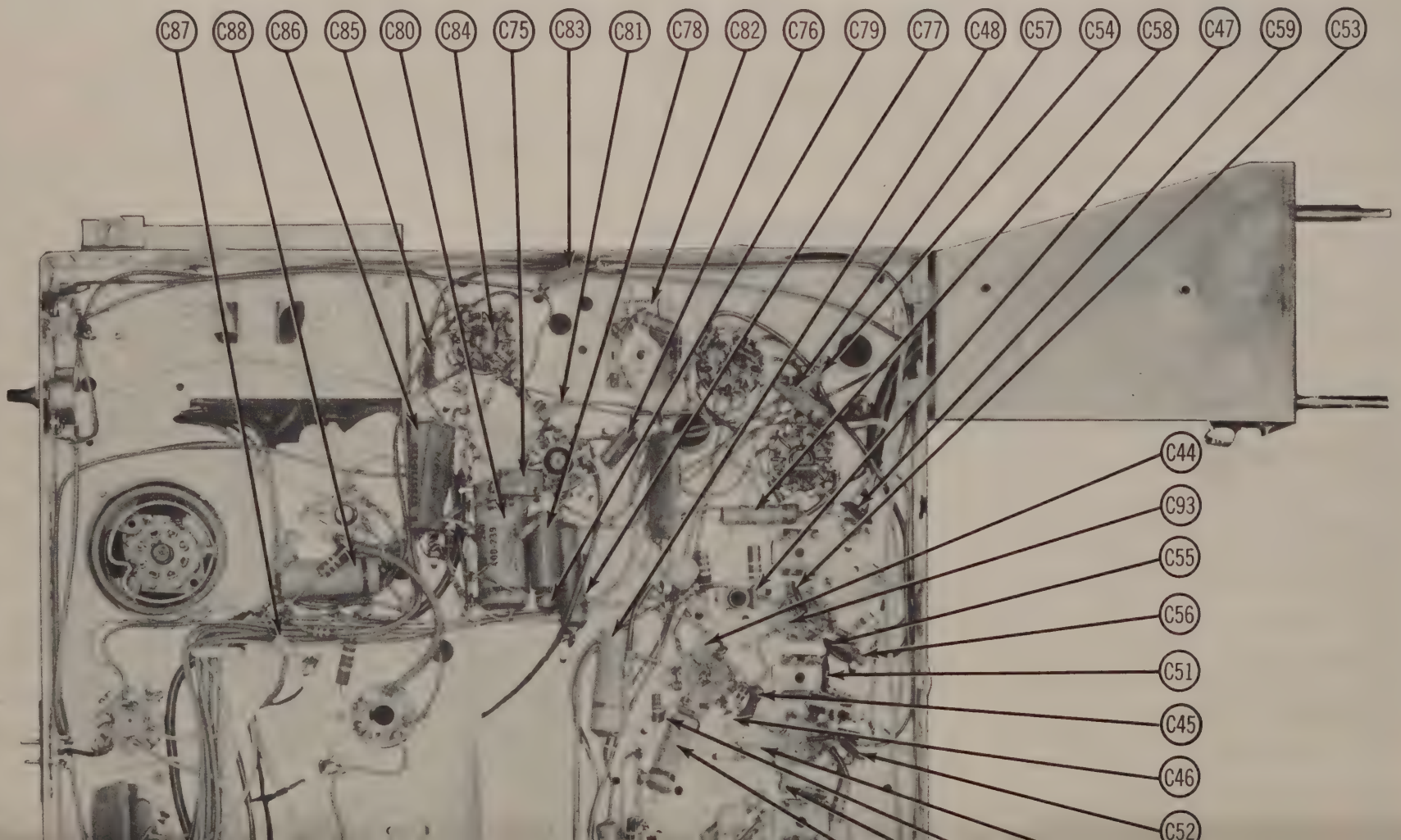
TUBE PLACEMENT CHART



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

5C603, 5C604 (Ch. 1621)

CBS-COLUMBIA MODELS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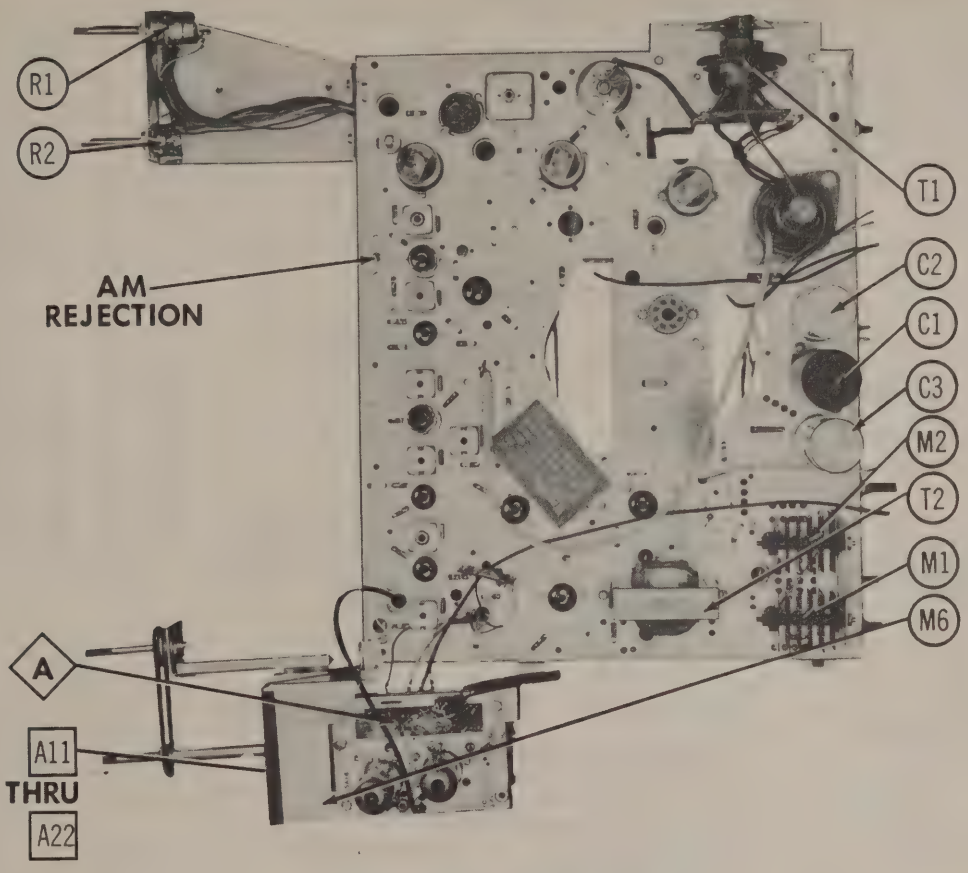
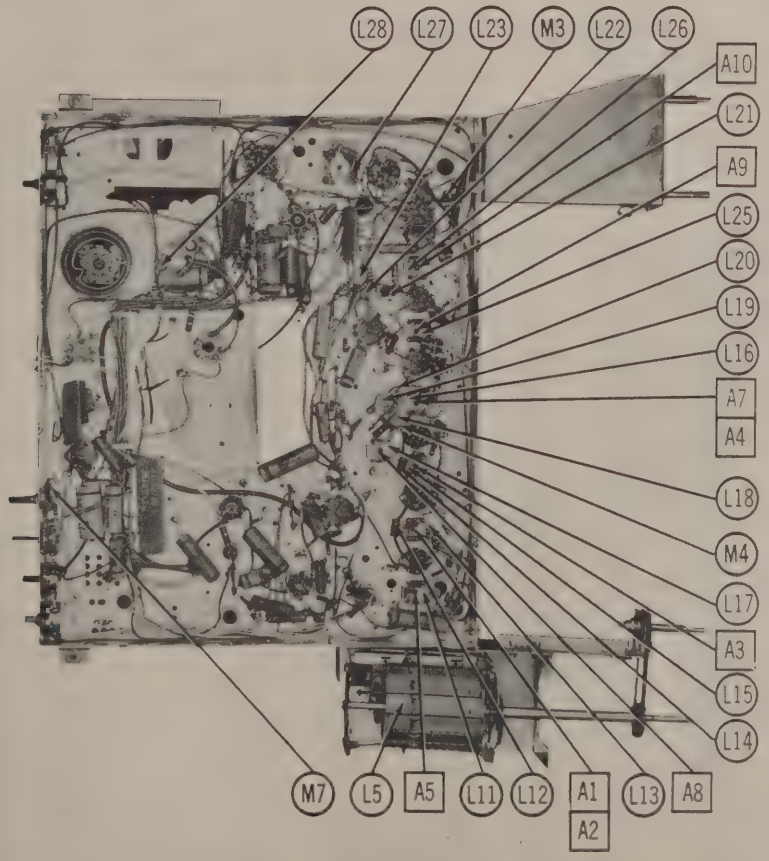


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW- INDUCTOR AND ALIGNMENT IDENTIFICATION

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: CBS-Columbia PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	4BQ7A	4BQ7A	
V2	Mixer-Oscillator	5AT8	5AT8	
V3	1st. Video IF Amplifier	3CB6	3CB6	
V4	2nd. Video IF Amplifier	3CB6	3CB6	
V5	1st Sound IF Amplifier 3rd Video IF Amplifier	3CB6	3CB6	
V6	Video Output	12BY7A	12BY7A	
V7	2nd. Sound IF Amplifier	3AU6	3AU6	
V8	Audio Detector	3BN6	3BN6	
V9	Audio Output	12L6GT	12L6GT	
V10	Sync Separator- Sync Amp.	7AU7	7AU7	
V11	Vert. Mult.	7AU7	7AU7	
V12	Vert. Output	12B4A	12B4A	
V13	Horiz. AFC-Horiz. Osc.	6SN7GT	6SN7GT	6SN7GTB may be used as an alternate
V14	Horiz. Output	12CU6	12CU6	
V15	Damper	12AX4GT	12AX4GT	
V16	HV Rectifier	1B3GT	1B3GT	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: CBS-Columbia PART No.	REPLACEMENT DATA: CBS PART No.	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	REPLACEMENT DATA: SYLVANIA PART No.	NOTES
V17	24DP4A ①	24DP4A ①	24DP4A ①	24DP4A ② 24DP4	① Aluminized ② Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: CBS-Columbia PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: PYRAMID PART No.	REPLACEMENT DATA: SANGAMO PART No.	REPLACEMENT DATA: SPRAGUE PART No.
C1	140	200	21000981	AFHS1-37-25	XA007	FP131	TMS34	S-160	TVL-1540
C2A	▲140	300	21001131			FP451.3		Q-282	
B	■10	300				TC42		MTD-1508	
C	▲10	150							
D	100	25							
C3A	▲140	300	21001141			FP384.14	TM-3141	Q-162	
B	▲200	150				TC78		MT-4540	
C	■10	300							
C4	5	350	21000481 (Note 1)		BR1235 *	TC62 *	TD-5-350NP	FM-4510 *	TVA-1604 *
					BR1235	TC62		FM-4510	TVA-1604

Note 1. C4 is a non-polarized unit.
* Connect negative leads together.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	CBS-Columbia PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: SPRAGUE PART No.	NOTES
C5	120			SI120	D6-121	TP35	GP2K-121	UC-5312	5GA-T12	
C6	5			NP0-DI5	TCZ-4R7	Z011	NP0A-050	ZT-555	5TCCB-V47	
C7	6.8			NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C8	6.8			NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C9	3-12									
C10	1000									
C11	2.2			NP0-SI2.2	TCZ-2R2	Z006	NP0A-2R2		5TCCB-V22	
C12	.5-3				829-3		3115-01-0R5	CT565A		
C13	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C14	1.5			NP0-SI1.5	TCZ-1R5	Z004	NP0A-1R5	ZT-5515	5TCCB-V15	
C15	1000									
C16	.5-3				829-3		3115-01-0R5	CT565A		
C17	60									
C18	1			NP0-SI1	TCZ-1	TZ03	NP0A-010			
C19	10									
C20	8.2									
C21	1000									
C22	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C23	1000									
C24	1000									
C25	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C26	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C27	1500	1000	23064640	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C28	.22	200	22011320	P288N-22		CUB2P22		PT4022	2TM-P22	
C29	1500	1000	23064640	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C30	390		23002190	SI390	D6-391	TP44	GP2K-391	UC-5339	5GA-T39	
C31	1500	1000	23064640	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C32	1500	1000	23064640	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C33	1500	1000	23064640	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C34	470		23004700	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C35	1500	1000	23064640	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C36	180			SI180	D6-181	TP37	GP2K-181	UC-5318	5GA-T18	Note 2
C37	5000	1000	23064680	HVD-15-4700	DD-502	VD47	1R5KV-472		10HK-D47	
C38	680		23004720	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C39	5000	1000	23064680	HVD-15-4700	DD-502	VD47	1R5KV-472		10HK-D47	
C40	5000	1000	23064680	HVD-15-4700	DD-502	VD47	1R5KV-472		10HK-D47	
C41	1500	1000	23064640	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C42	.22	200	22011320	P288N-22		CUB2P22		PT4022	2TM-P22	
C43	.047	200	22011240	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C44	5000	1000	23064680	HVD-15-4700	DD-502	VD47	1R5KV-472		10HK-D47	
C45	2000		23000591	SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C46	220			SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	Note 3
C47	47			1469-000047	D6-470	5R5Q47	831-470	MCB225	MS-447	
C48	.1	400	22011780	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C49	.05	600	22012240	BPD-05	DF-503	CUB6S5		PT615	6TM-S5	
C50	100		23001620	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C51	10000		23066020	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C52	10000		23066020	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C53	10000		23066020	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C54	5000	1000	23064680	HVD-15-4700	DD-502	VD47	1R5KV-472		10HK-D47	
C55	10000		23066020	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C56	1000		23001740	SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C57	.0047	400	22011620	SI4700	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C58	.01	400	22011660	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C59	10000		23066020	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C60	.022	400	22011700	BPD-02	DD-203	CUB4S22	817-02	PT4122	4TM-S22	
C61	470		23002200	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C62	10			SI10	D6-100	TP09	GP1K-100	UC-541	5GA-Q1	Note 4
C63	.022	400	22011700	BPD-02	DD-203	CUB4S22	817-02	PT4122	4TM-S22	
C64	2000		23000591	SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C65	5000		23000601	SI5000	D6-502	TP64	GP2-333-502	UC-525	5HK-D5	
C66	5000		23000601	SI5000	D6-502	TP64	GP2-333-502	UC-525	5HK-D5	
C67	1000		23001240	SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D2	
C68	.01	400	22011660	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	

PARTS LIST AND CAPACIT

ITEM No.	RATING: CAP.	RATING: VOLT	CBS-Columbia PART No.	AEROVOX PART No.	CENTRALAB PART No.
C69	.033	200	22007720	BPD-03	DF-303
C70	.0033	600	22001600	1464-0033	
C71	.047	400	22008240	BPD-05	DF-503
C72	.033	600	22007720	BPD-03	DF-303
C73	.1	400	22008280	P488N-1	DF-104
C74	.022	600	22012200	BPD-02	DD-203
C75	82	500	20007010	1469-000082	TCZ-82
C76	82	500	20007010	1469-000082	TCZ-82
C77	.047	400	22008240	BPD-05	DF-503
C78	.1	200	22014280	P288N-1	DF-104
C79	.022	200	22008200	BPD-02	DD-203
C80	.47	200	22007840	P288N-47	
C81	180	500	20007090	NP0-SI180	TCZ-180
C82	.01	200	22014160		
C83	820	500	20007270	1464-00082	
C84	470		23002200	SI470	D6-471
C85	1000		23001740	SI1000	D6-102
C86	.1	400	22011780	P488N-1	DF-104
C87	470		23002200	SI470	D6-471
C88	.1	400	22008280	P488N-1	DF-104
C89	150	3000		HVD-30-150	DD30-151
C90	5000	1000	23064680	HVD-15-4700	DD-502
C91	.01	600	22017660	BPD-01	D6-103
C92	1500	1000	23064640	HVD-15-1500	DD-152
C93	1500	1000	23064640	HVD-15-1500	DD-152
C94	1500	1000	23064640	HVD-15-1500	DD-152
C95	1500	1000	23064640	HVD-15-1500	DD-152
C96	1500	1000	23064640	HVD-15-1500	DD-152
C97	1500	1000	23064640	HVD-15-1500	DD-152
C98	1500	1000	23064640	HVD-15-1500	DD-152

Note 2. Not used in some versions.
Note 3. Some versions may use 100MMF in this application (p
Note 4. Some versions may use 12MMF in this application (pa
Note 5. Some versions may use 56MMF or 82MMF in this app

CONTR

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT: CBS-Columbia PART No.	REPLACEMENT: CENTRALAB PART No.	REPLACEMENT: CLAROSTA PART No.
R1A	750Ω	1	36001551		
B	350KΩ	½			
R2A	100KΩ	½	36001501	F1-31	
B	3Meg	½		R2-78	
R3A	2500Ω	1	36001541		A43-2500
B	Shaft		Not Req.		RN-3
R4A	2.5Meg	½	36001521	BX-83	A47-2.5Me S
B	Shaft		Not Req.	Not Req.	RN-3
R5A	250KΩ	½	36001511	AB-50	A47-250K-S
B	Shaft		Not Req.	AK-19	RN-3
R6A	10KΩ	2	36001531		A43-10K
B	Shaft		Not Req.		RN-3
R7	600Ω	2	36001311		39-600

* Concentrikit Equivalent: K-2 Kit, Base Elements & Shafts, Bl
Bl

RESIST

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: CBS-Columbia PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R8	680KΩ	½		BTS-680K	
R9	4700Ω	½		BTS-4700	
R10	820KΩ	½		BTS-820K	
R11	560KΩ	½		BTS-560K	
R12	1200Ω	½		BTS-1200	
R13	10KΩ	½		BTS-10K	
R14	220KΩ	½		BTS-220K	
R15	10KΩ	½		BTS-10K	
R16	5600Ω	½		BTS-5600	
R17	47KΩ	½		BTS-47K	
R18	1000Ω	½		BTS-1000	
R19	270KΩ	½	30274230	BTS-270K	
R20	4.7Meg	½	30475230	BTS-4.7Meg	
R21	27KΩ	½	30273230		
R22	1000Ω	½	30102330	BTS-1000	
R23	330Ω	½	30331330	BTS-330	
R24	330Ω	½	30331330	BTS-330	
R25	47Ω	½	30470230	BTS-47	
R26	56KΩ	½	30563230		
R27	1000Ω	½	30102330	BTS-1000	
R28	330Ω	½	30331330	BTS-330	
R29	47Ω	½	30470230	BTS-47	
R30	56KΩ	½	30563230		
R31	5600Ω	1	30562240	BTA-5600	
R32	1000Ω	½	30102330	BTS-1000	
R33	180Ω	½	30181230	BTS-180	
R34	1000Ω	1	30102230	BTA-1000	
R35	12KΩ	½	30123230	BTS-12K	Note 1
R36	4700Ω 5%	½	30472130	BTS-4700 5%	
R37	100KΩ	½	30104330	BTS-100K	
R38	82KΩ	½	30823230	BTS-82K	
R39	1Meg	½	30105330	BTS-1Meg	
R40	1Meg	½	30105230	BTS-1Meg	
R41	1Meg	½	30105330	BTS-1Meg	
R42	6800Ω	½	30682230	BTS-6800	Note 2
R43	5000Ω	5	31000531	PW7-5000	
R44	27KΩ	1	30273240	BTA-27K	
R45	47Ω	½	30470230	BTS-47	
R46	120KΩ	½	30124230	BTS-120K	
R47	22KΩ	½	30223230	BTS-22K	
R48	1000Ω	½	30102330	BTS-1000	
R49	100KΩ	½	30104230	BTS-100K	
R50	10KΩ	2	34103250	BTB-10K	
R51	12KΩ	½	30123230	BTS-12K	
R52	120Ω	½	30121230	BTS-120	
R53	1000Ω	½	30102330	BTS-1000	
R54	1000Ω	½	30102230	BTS-1000	
R55	3900Ω	1	30392240	BTA-3900	
R56	22KΩ	½	30223330	BTS-22K	

♦ Items R103, R103B are combi
Note 1. Some versions use a 82
Note 2. Some versions use a 18

S

SPRAGUE PART No.	NOTES
6TM-S33	
MS-233	
4TM-S47	
6TM-S33	
4TM-P1	
6TM-S22	
MS-482	
MS-482	
4TM-S47	
2TM-P1	
4TM-S22	
2TM-P47	
MS-318	
MS-382	
5GA-T47	
5HK-D1	
4TM-P1	
5GA-T47	
4TM-P1	
30GA-T15	Note 5
10HK-D47	
6TM-S1	
10HKB-D15	
10HKB-D15	
10HKB-D15	
10HKB-D15	
10HKB-D15	
10HKB-D15	
10HKB-D15	

INSTALLATION NOTES

Picture (Panel)
Volume & switch (Rear)
Horiz. Hold (Panel)
Vert. Hold (Rear)
Vert. Linearity
Attach to R3A
Height

Attach to R4A
Brightness
Attach to R5A
Width
Attach to R6A
AM Rejection (wire wound)

REPLACEMENT DATA		NOTES
CBS-Columbia PART No.	IRC PART No.	
105230	BTS-1Meg	
165230	BTS-5.6Meg	

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: CBS-Columbia PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.
T1	Horiz. Output Trans.	12001181	FB420 *①	HVO-54*①	235T1 * ①	X129*①
T2	Vert. Output Trans.	10000661	Z1900②	A-2823		V303 ①
T3A	Yoke(90°) Horiz. (20.5MH)	16001491③	DF607④⑤	MDF-92 ④⑤	235D1④⑤	Y90F19/43 ④⑤
B	Vert. (37MH)					

① Drill new mounting hole(s).
② Use 8 to 1 turns ratio.
③ Included cable and plug.
④ Use original rear cover and centering device.
⑤ Use original horizontal damping network.

*HORIZONTAL OUTPUT TRANSFORMER CONNEC

Use Original Width Coil Unless Replacement Type Is Li

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Re Co
	5	5	5	9	5	
	4	3	4	7	4	
	3	See Note ⑥ NC	See Note ⑥ NC	See Note ⑥ NC	See Note ⑥ NC	Se
	2	1	2	1	2	
	1	1	1	1	1	
Special Notes →		⑥	⑥	⑥	⑥	

⑥ If necessary to reduce yoke ringing connect a capacitor of approxi
with capacitor C89 and connect a resistor approximately 1K ½ W in se
⑦ Jumper terminals 2 and 4 of replacement unit.

TRANSFORMER (AUDIO OUTPU

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: CBS-Columbia PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	P
T4	2.1KΩ	3-4Ω	Part of Spkr. 73000871	Z1005	A-2928	A-3876	24S50	S

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: CBS-Columbia PART No.	QUAM PART No.	RCA TYPE No.
SP1	8"	PM	3-4Ω	73000871	8A21	208S2

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: CBS-Columbia PART No.	MEISSNER PART No.	MERIT PART No
L1	Ant. Match. Trans.	0Ω	0Ω			
L2	Ant. Match. Trans.	0Ω	0Ω			
L3	FM Trap	0Ω				
L4	IF Trap	.2Ω				
L5	Ant., RF Mixer Grid, & Osc. Coils	0Ω				
L6	Fil. Choke	0Ω				

PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	CBS-Columbia PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.220ADC	62000061	1236A	MR300	6S300	6Q4	300	
M2	.220ADC	62000061	1236A	MR300	6S300	6Q4	300	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			CBS-Columbia PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3	LC	1½A			33301.6 (N Slo-Blo 1 6/10A)	346016	N 1 6/10	HN 1 3/10 to 1 3/4

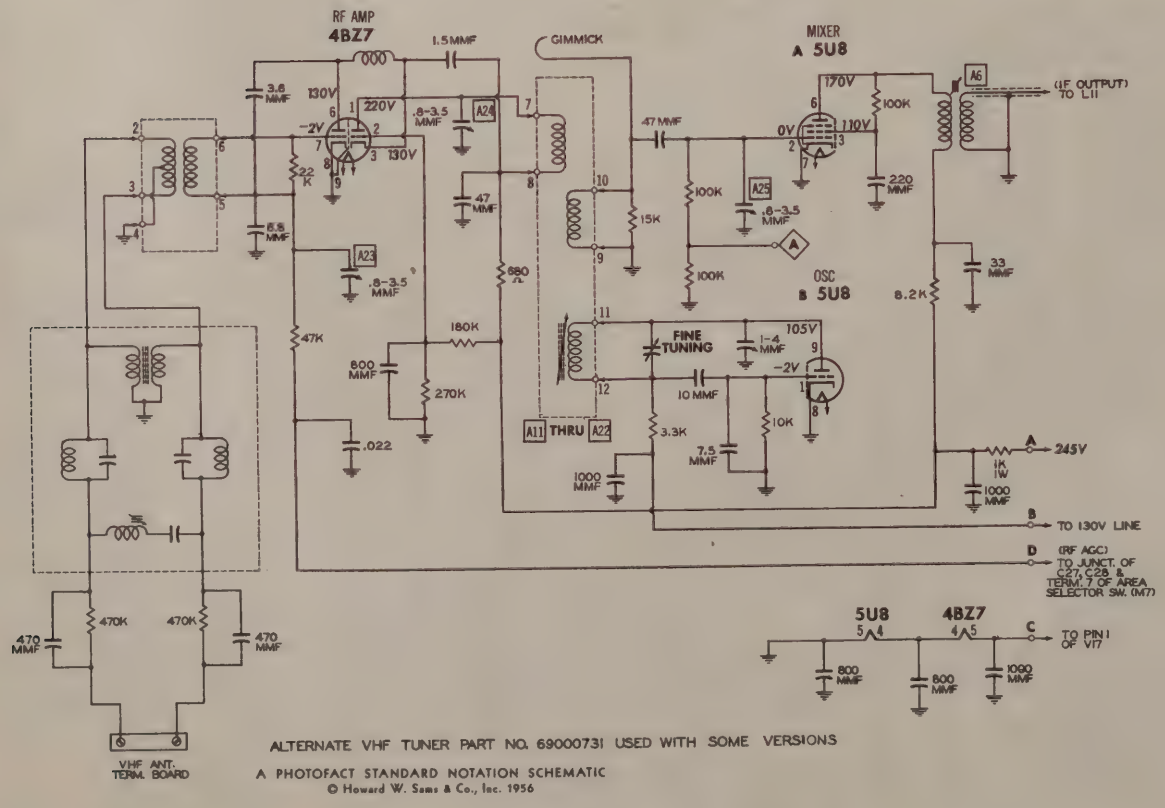
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		CBS-Columbia PART No.	SYLVANIA PART No.	
M4	1N60 *	63000091	1N60	Video Detector (Pigtail)

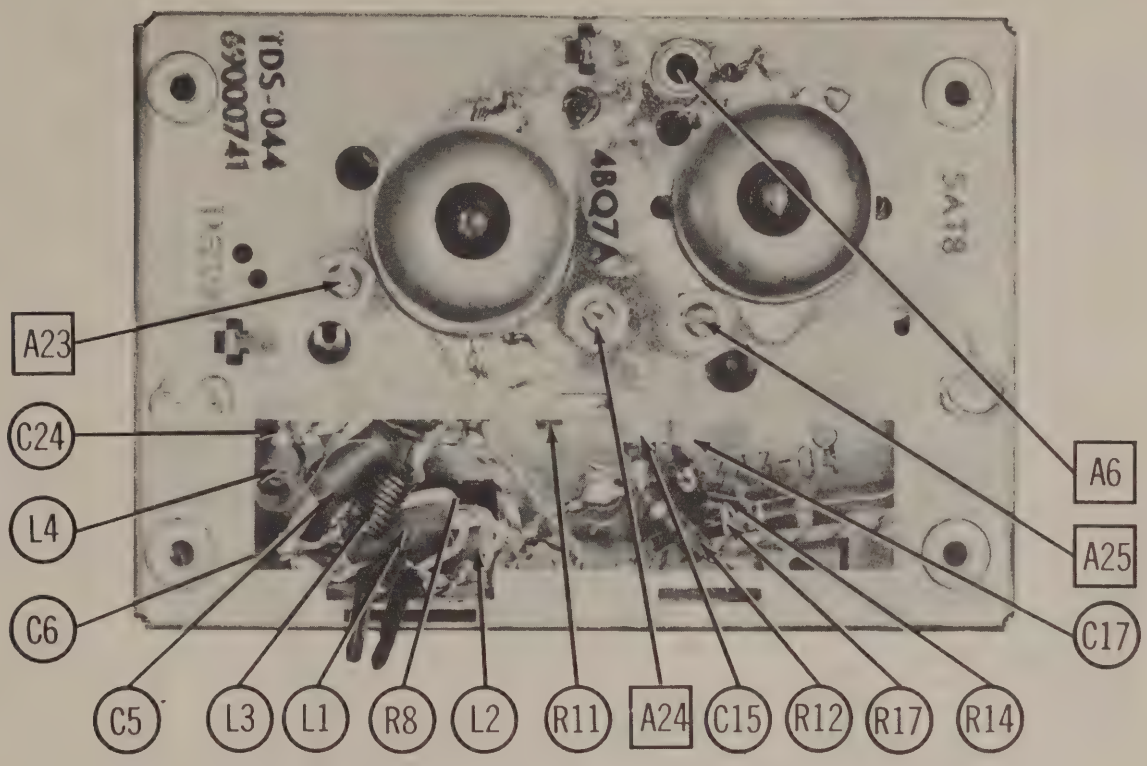
* Some versions may use crystal diode type 1N64 in this application.

MISCELLANEOUS

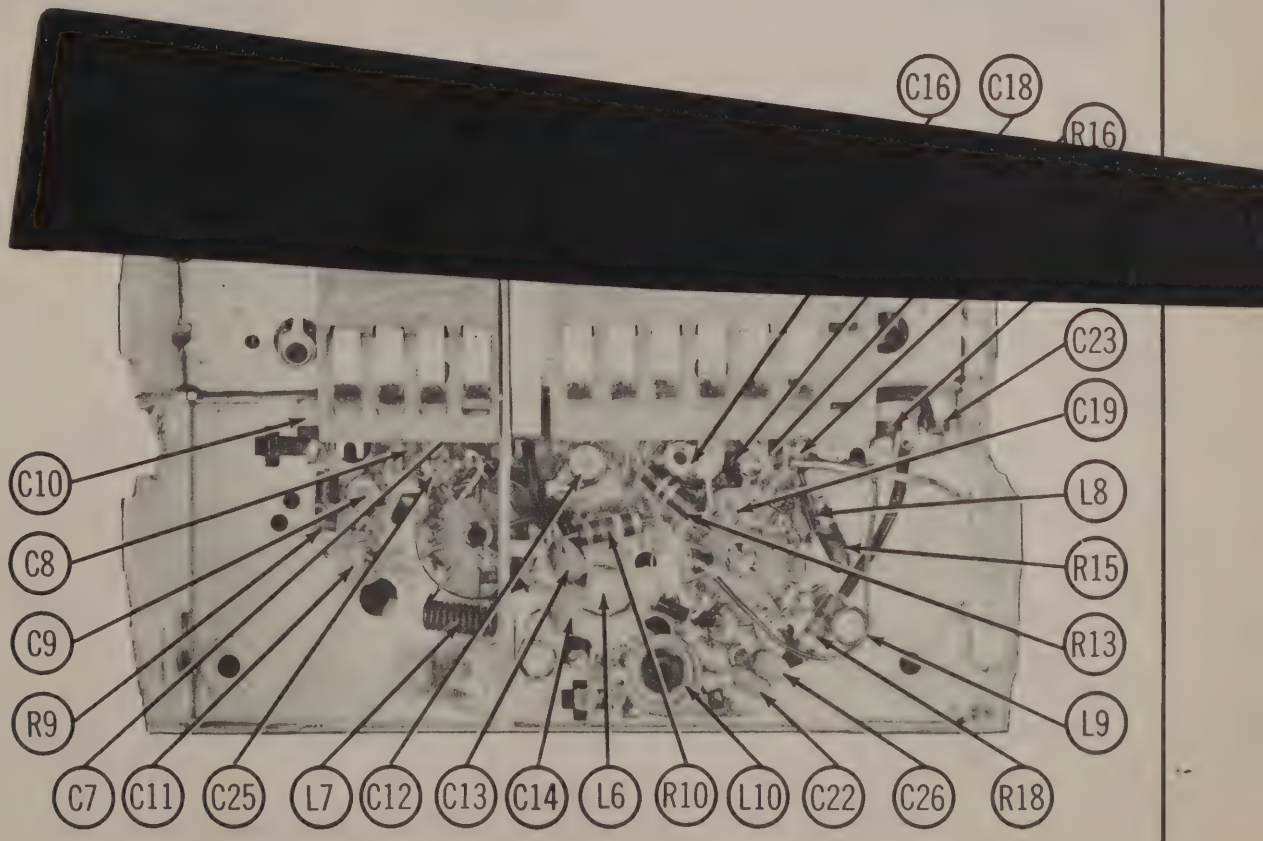
ITEM No.	PART NAME	CBS-Columbia PART No.	NOTES
M5	Dial Light	64000111	#51
M6	Tuner	69000741	VHF - Not used in some versions
	Tuner	69000731	VHF - Not used in some versions
M7	Switch	40000371	Local-normal-distant (SP-3position-rotary, wafer type)
M8	Centering Device		Part of deflection yoke (T3) rear cover
M9	Ion Trap	19000081	
B3	Trimmer Cap.	25000061	Horiz. Drive (25-250MMF)
	Knob	76003721	Channel selector - Model 5C603
	Knob	76003722	Channel selector - Model 5C604
	Knob	76003701	Fine tuning (front), on-off-volume & vert. hold - Model 5C603
	Knob	76003702	Fine tuning (front), on-off-volume & vert. hold - Model 5C604
	Knob	76003691	Fine tuning (rear) - Model 5C603
	Knob	76003692	Fine tuning (rear) - Model 5C604
	Knob	76003711	Contrast & horiz. hold - Model 5C603
	Knob	76003712	Contrast & horiz. hold - Model 5C604
	Knob	76003331	Local-normal-distant switch
	Mask	71001661	
	Safety Glass	77000434	



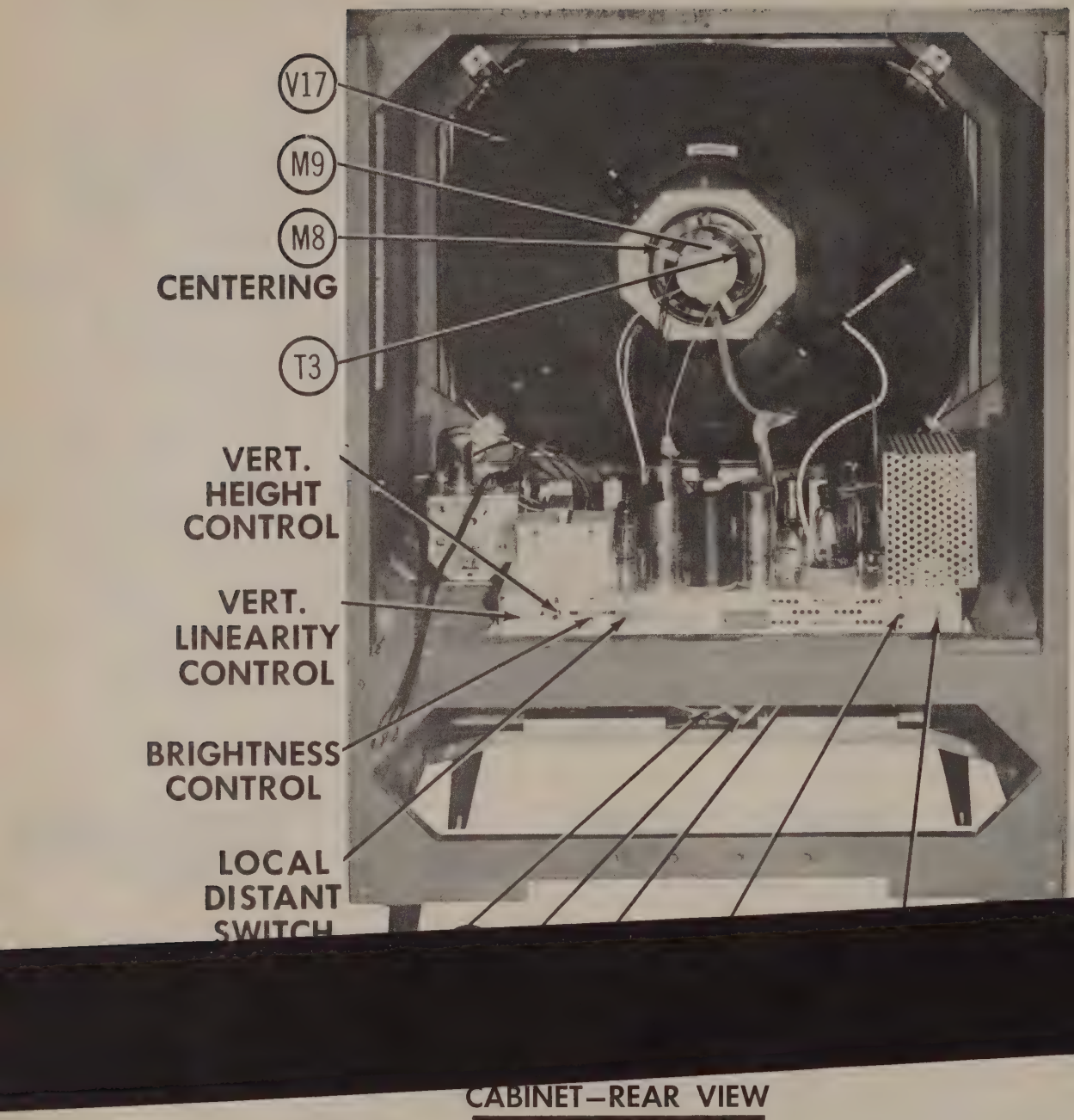
ALTERNATE TUNER SCHEMATIC



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn the set on and tune in a TV station. Adjust the controls for a normal picture. Set the horizontal hold control to the center of its range.

2. Short terminals "C" and "D" of the horizontal oscillator coil (L28) and adjust the horizontal frequency slug (B1) until the picture is in sync. Set the slug at the center of its range in which the picture remains in sync.

3. Remove the short and connect the vertical amplifier of an oscilloscope thru a 10MMF capacitor to terminal "C" of L28. Low side to chassis.

4. Adjust the horizontal waveform slug (B2) for waveform shown in Fig. 3. The round peak and the sharp peak must be of equal amplitude.

5. Adjust B1 so that the picture just begins to fall out of sync with the horizontal hold control fully clockwise.

6. Turn drive control (B3) clockwise as far as possible without the presence of vertical white lines or compression near the center of the screen.

7. Adjust width control (R6) for picture slightly wider than necessary to fill screen horizontally.

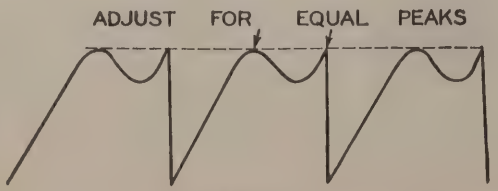


FIG. 3

COLUMBIA RECORDS
MODEL 426

COLUMBIA RECORDS
MODEL 426

TRADE NAME	Columbia Records Model 426
MANUFACTURER	Columbia Records, 799 Seventh Ave., New York 19, N.Y.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Automatic Record Changer
TUBES (Three)	Types 12AX7 AF Amp.-Phase Inverter, (2) 50L6GT Output
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING .39 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR V-M MODEL 954B - PHOTOFACT SET #302 - FOLDER 12.

PROPERTY OF
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DENVER, COLORADO

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		Columbia Records PART No.	STANDARD REPLACEMENT	
V1	AF Amplifier-Phase Inverter	12AX7	12AX7	
V2	Output	50L6GT	50L6GT	
V3	Output	50L6GT	50L6GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Columbia Records PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	20	300		PRS450V20	BR2035	TC65	TD-20-350	FM-4520	TVA-1608
C2A	20	450					TML-5	Q-315	
B	40	300							
C	30	300							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Columbia Records PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C4	2000			BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C5	2000			BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C6	270			SI270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27	
C7	680			SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C8	.25	200		P288N-25		CUB2P25		PT4025	2TM-P25	
C9	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C10	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C11	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C12	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C13	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C14	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C15	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C16	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C17	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Columbia Records PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	3Meg	½						Volume-Taps ⓐ 1Meg and 1.7Meg
R2A	250KΩ	½		ABT-53	A47F1-250K	Q13-130X		Treble -Tap ⓐ120KΩ
B	Shaft			AK-4	KSS-3	Not Req.		Attach to R2A
R3A	5Meg	½		AB-87	A47-5Meg-S	Q11-141	U-67	Bass
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	Attach to R3A

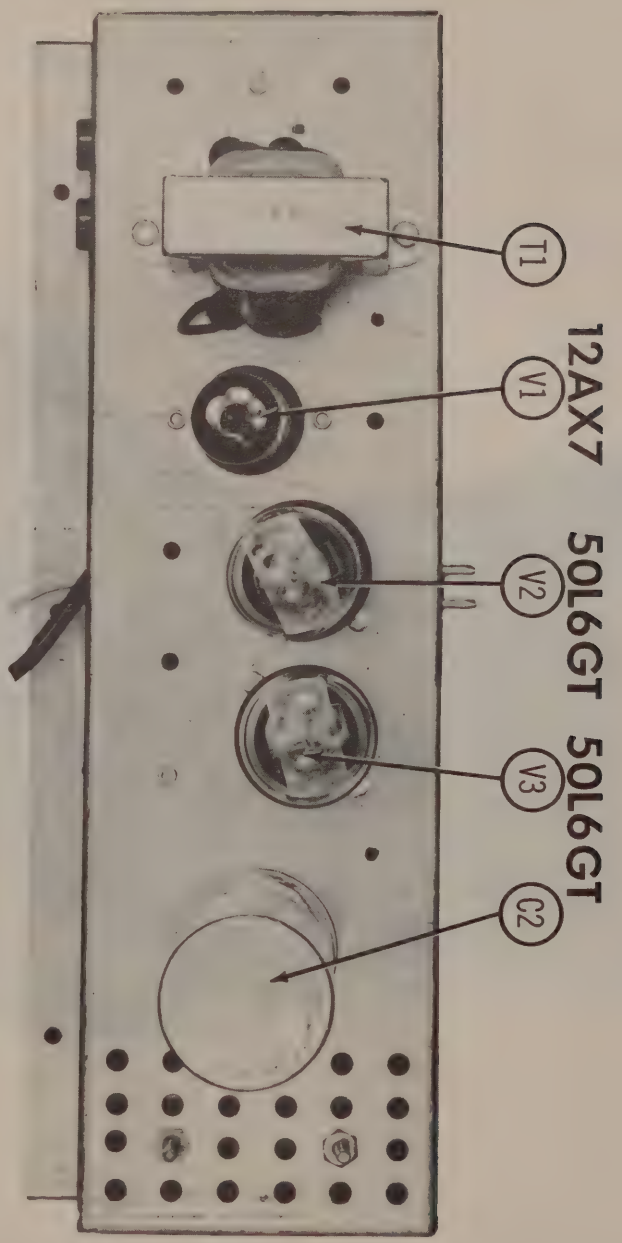
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Columbia Records PART No.	IRC PART No.	
R4	33KΩ	½		BTS-33K	Note 1
R5	100KΩ	½		BTS-100K	
R6	100KΩ	½		BTS-100K	
R7	220KΩ	½		BTS-220K	
R8	33KΩ	½		BTS-33K	
R9	3.3Meg	½		BTS-3.3Meg	Note 1
R10	220KΩ 5%	½		BTS-220K 5%	
R11	47KΩ	½		BTS-47	
R12	270Ω	½		BTS-270	
R13	220KΩ 5%	½		BTS-220K 5%	
R14	10Meg	½		BTS-10Meg	
R15	270KΩ 5%	½		BTS-270K 5%	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Columbia Records PART No.	IRC PART No.	
R16	270KΩ 5%	½		BTS-270K 5%	
R17	270KΩ 5%	½		BTS-270K 5%	
R18	130Ω	5		PW7-150	Note 2
R19	33KΩ	½		BTS-33K	
R20	10KΩ	2		BTB-10K	
R21	10KΩ	2		BTB-10K	
R22	6.8Meg	½		BTS-6.8Meg	
R23	6.8Meg	½		BTS-6.8Meg	
R24	220Ω	5		1 3/4A-225	
R25	10KΩ	1		BTA-10K	
R26	47Ω	5		PW7-50	
R27	22Ω	1			

Note 1. Not used in some versions.
Note 2. Some versions use 150Ω in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Columbia-Records PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	4.6KΩ CT	1.55Ω SEC. 2 21Ω RES							

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA Columbia-Records PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	6"	PM	3.1Ω	417-HF1	6A21	224S1	① Electrostatic speakers
SP2	6"	PM	3.1Ω	417-HF1	6A21	224S1	
SP3				SP1 ①			
SP4				SP1 ①			

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA Columbia Records PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.090ADC		1005A	RS150	6S150	5P1	150A	
M2	.090ADC		1005A	RS150	6S150	5P1	150A	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA Columbia Records PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M3		55-T	GD-J	47	0-1 or S-1 & 0-3	

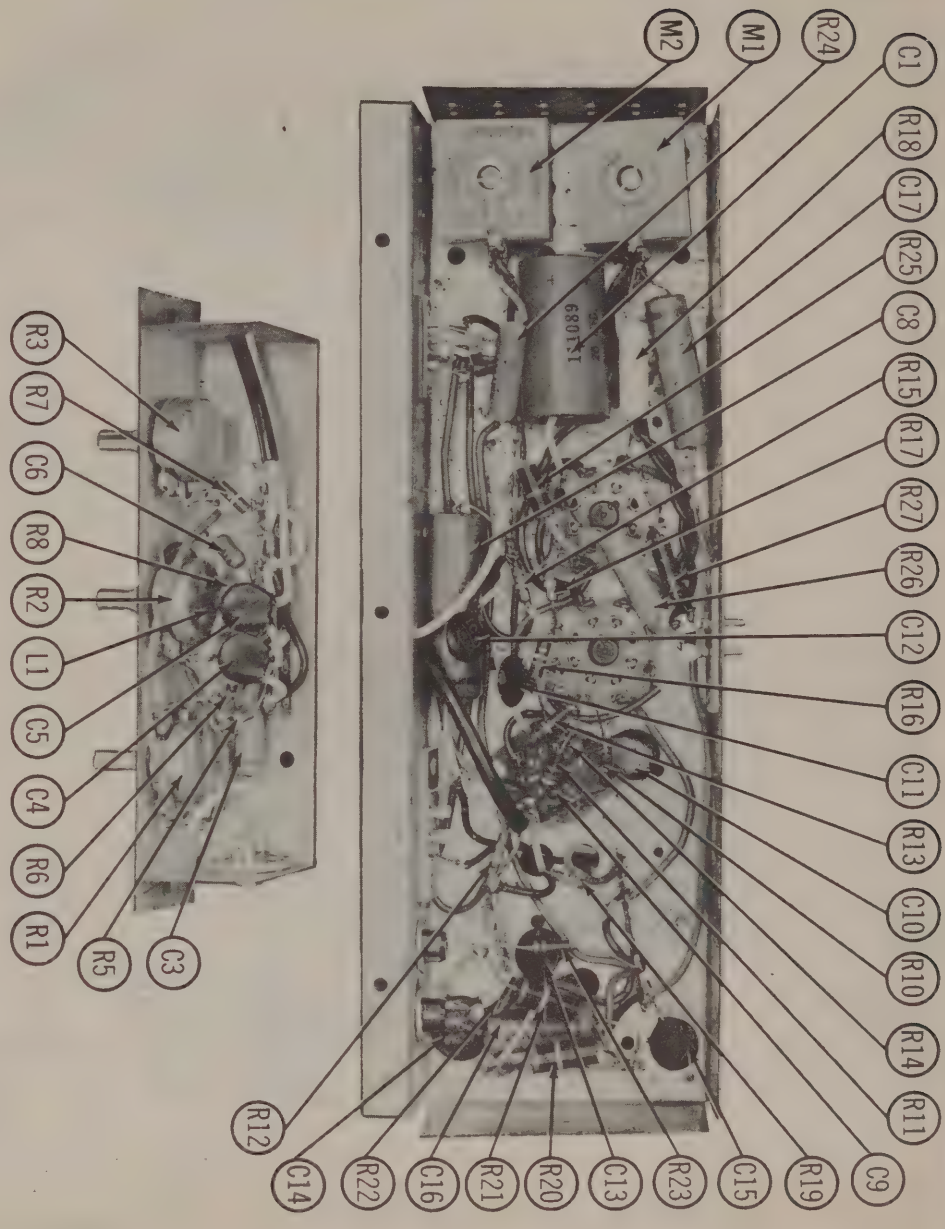
ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

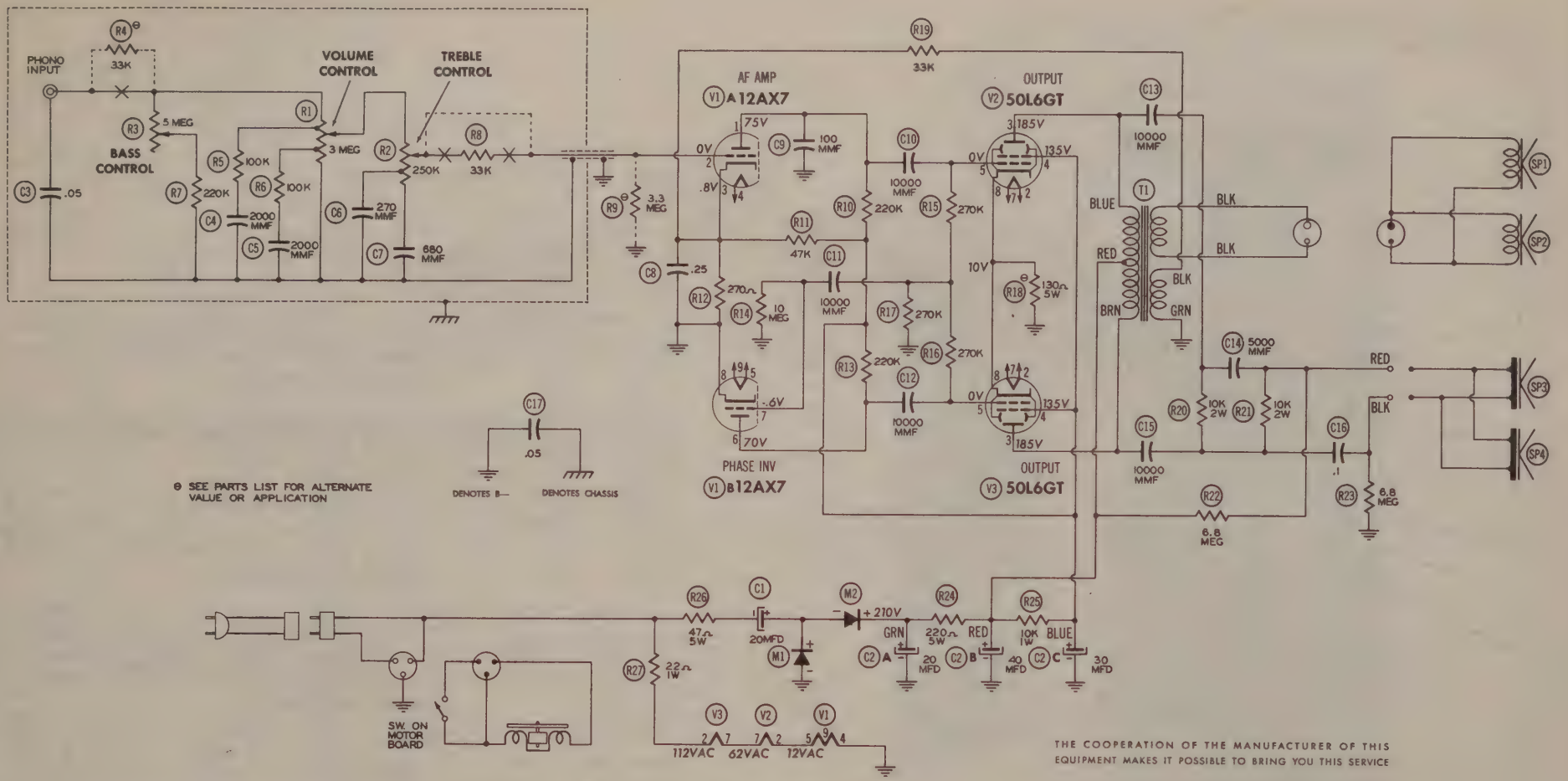
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA Columbia Records PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M4		*S-67 or †S-66 or ♦†S-66SD or ♦S-66D	†AC-434 or ♦†AC-434D1 or †♦AC-434D2 ♦AC-434D	†W-75TPS or ♦†W-75DS or ♦W-75TPD	* Metal † Jewel ♦ Diamond

CHASSIS—BOTTOM VIEW





⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	† 230KΩ	280KΩ	270Ω	0Ω	12Ω	† 230KΩ	10Meg	0Ω	6Ω
V 2	50L6GT	NC	12Ω	† 400Ω	† 10.2KΩ	540KΩ	TP	62Ω	130Ω	
V 3	50L6GT	NC	112Ω	† 400Ω	† 10.2KΩ	540KΩ	TP	62Ω	130Ω	

† - MEASURED FROM OUTPUT OF M2.
NC - NO CONNECTION.
TP - TIE POINT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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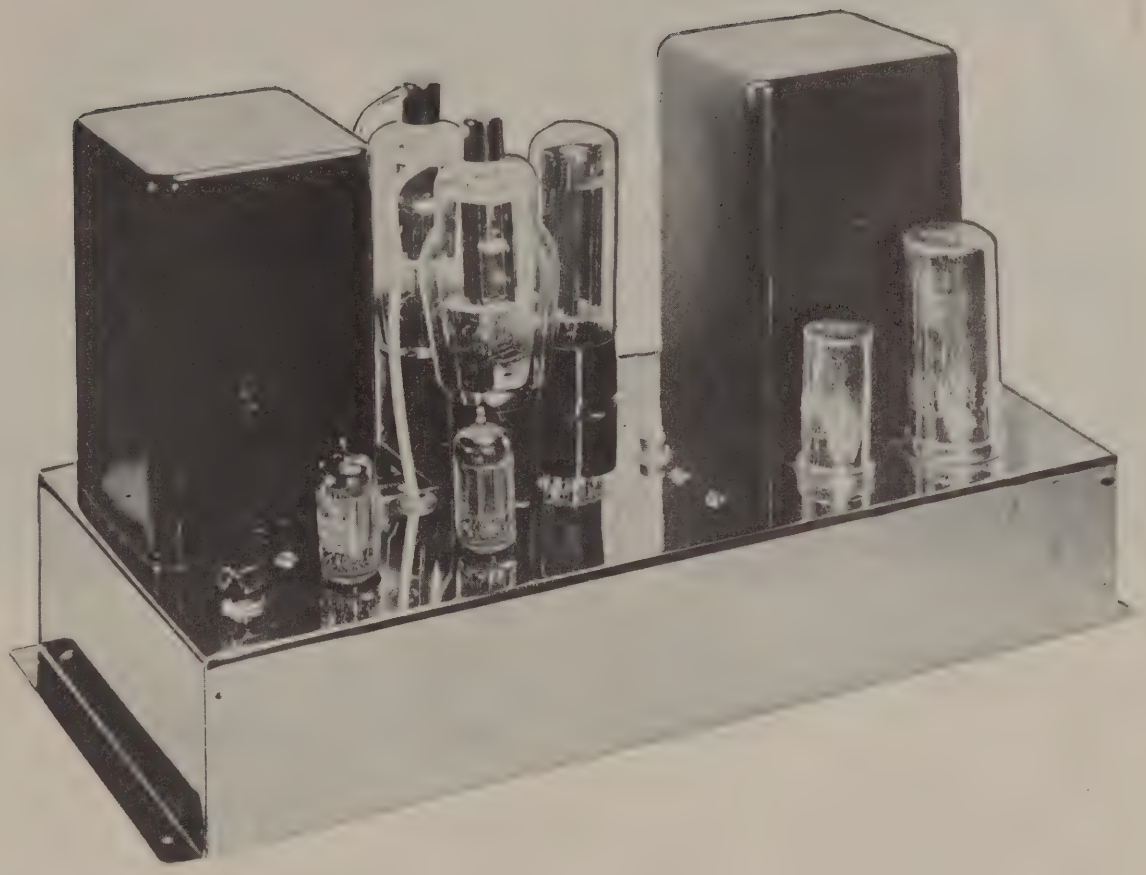
GROMMES
MODEL 216BA



GROMMES
MODEL 216BA

TRADE NAME	Grommes Model 216BA
MANUFACTURER	Precision Electronics, 9101 King Ave,, Franklin Park, Ill.
TYPE SET	AC Operated 30 Watt Amplifier
TUBES (Five)	Types 12AU7 AF Amp.-Phase Inverter, 12AU7 Driver, (2) 6BG6G Output, 5U4GA Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .94 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

GROMMES MODEL 216BA

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		GROMMES PART No.	STANDARD REPLACEMENT	
V1	AF Amplifier-Phase Inverter	12AU7	12AU7	
V2	Driver	12AU7	12AU7	
V3	Output	6BG6G	6BG6G	
V4	Output	6BG6G	6BG6G	
V5	Rectifier	5U4GA	5U4GA	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	GROMMES PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	450		AFH3-50-05	D013	FP396.1	TM-403020-450	T-160	TVL-4763
B	■20	450							
C	▲20	450							
C2A	10	350		AFH3-27	C021	FP330.5	TM-T10-350	T-105	TVL-3690
B	▲10	350							
C	■10	350							
C3	10	250		PRS250V12	BR1225	TC52	TD-10-250	FM-2512	TVA-1504
C4	20	25		PRS25V25	BR202	TC26	TD-25-25	FM-0225	TVA-1205

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	GROMMES PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	.1	600		P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C6	.1	600		P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C7	.1	600		P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C8	.1	600		P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C9	.05	600		BPD-05	DF-503	CUB6S5		PT615	6TM-S5	
C10	68	500		SI68	D6-680	5W5Q68	GP1K-680	UC-5468	1FM-468	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	GROMMES PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½		ABT-62	A47F4-500K	Q18-133X	UT-429	Gain - tap ⓐ 50KΩ
B	Shaft			AK-9	RS-2	Not Req.	Not Req.	Attach to R1A
R2A	50Ω	2		VK-116	A43-50	W-50	C50P	Balance (wire wound)
B	Shaft			Not Req.	FKS-1/2	Not Req.	Not Req.	Attach to R2A

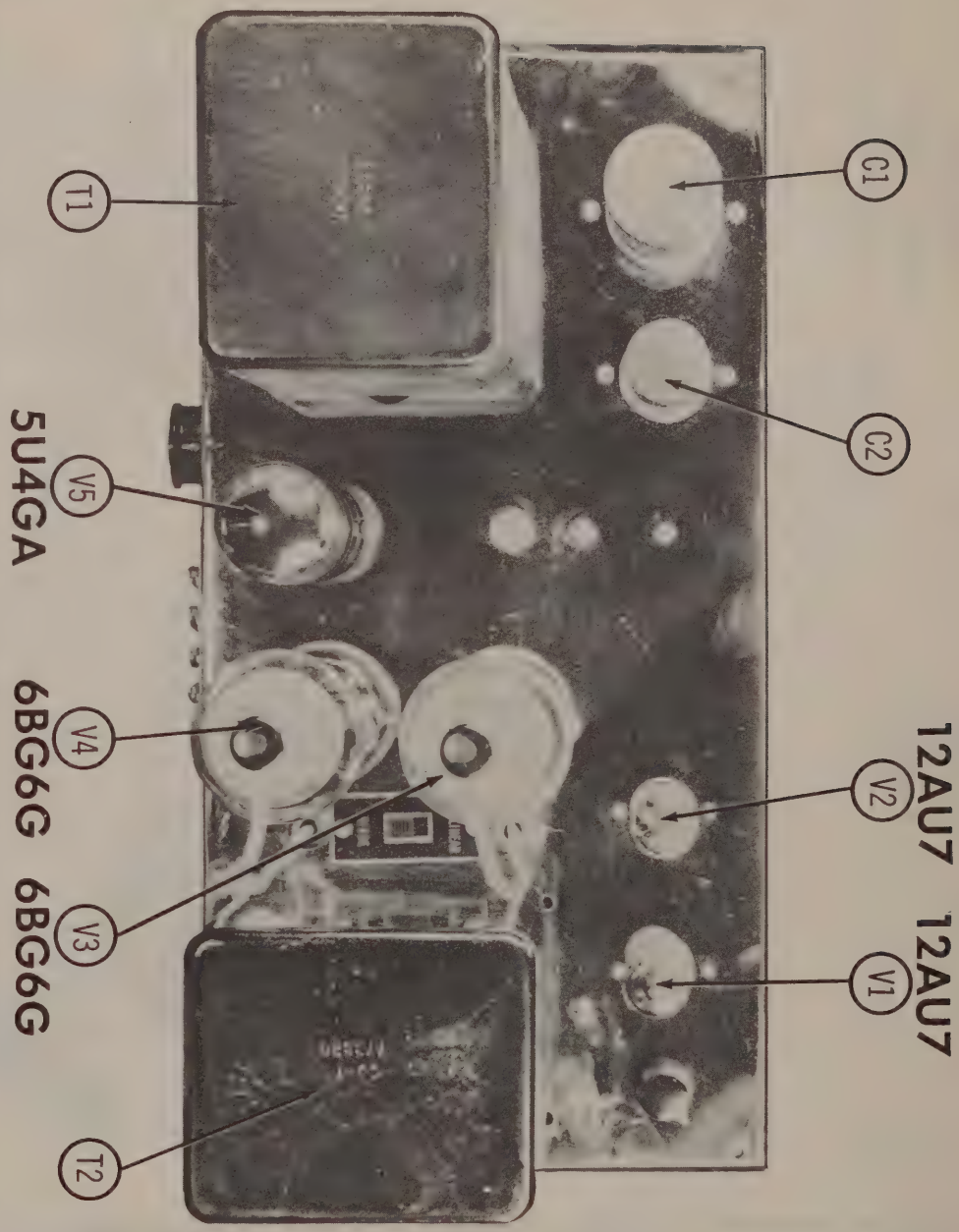
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	GROMMES PART No.	IRC PART No.	
R3	10KΩ	½		BTS-10K	
R4	1000Ω	1		BTA-1000	
R5	100KΩ	1		BTA-100K	
R6	27KΩ 5%	1		BTA-27K 5%	
R7	27KΩ 5%	1		BTA-27K 5%	
R8	22KΩ	½		BTS-22K	
R9	2700Ω	½		BTS-2700	
R10	1Meg	½		BTS-1Meg	
R11	56KΩ	2		BTB-56K	
R12	1000Ω 5%	1		BTA-1000 5%	
R13	1Meg	½		BTS-1Meg	
R14	56KΩ	2		BTB-56K	
R15	1000Ω 5%	1		BTA-1000 5%	
R16	4700Ω	1		BTA-4700	
R17	100KΩ 5%	1		BTA-100K 5%	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	GROMMES PART No.	IRC PART No.	
R18	1000Ω	½		BTS-1000	
R19	220KΩ	2		BTB-220K	
R20	100Ω	1		BTA-100	
R21	100KΩ 5%	1		BTA-100K 5%	
R22	1000Ω	½		BTS-1000	
R23	220KΩ	2		BTB-220K	
R24	100Ω	1		BTA-100	
R25	10KΩ	1		BTA-10K	
R26	5600Ω	2		BTB-5600	
R27	27KΩ	1		BTA-27K	
R28	220KΩ	½		BTS-220K	Note 1
R29	47KΩ	1		BTA-47K	
R30	4300Ω	5		1 3/4A-4500	Note 2
R31	220KΩ	2		BTB-220K	
R32	10KΩ	1		BTA-10K	

Note 1. Not used in some versions.
Note 2. Some versions use a 5000Ω, 5 W (WW) resistor in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	GROMMES PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC ②.94A	740VCT .120ADC	5VAC ② 3A	6.3VCT ② 2A ①				PC8410②	24R05U②	

① Current will be higher when preamplifier is used.
② Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	GROMMES PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	7KΩ CT tap ② 160Ω RES	16Ω tap② 8Ω		H4103 ①					① Drill new mounting holes.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	GROMMES PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L1	.120ADC	63Ω	2.6 HY		C5030	C-2974①	C-2325	C-21X①	26C43 ①

① Drill one new mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	GROMMES PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.0017ADC		1003A	RS050	6S75	5M4	75	

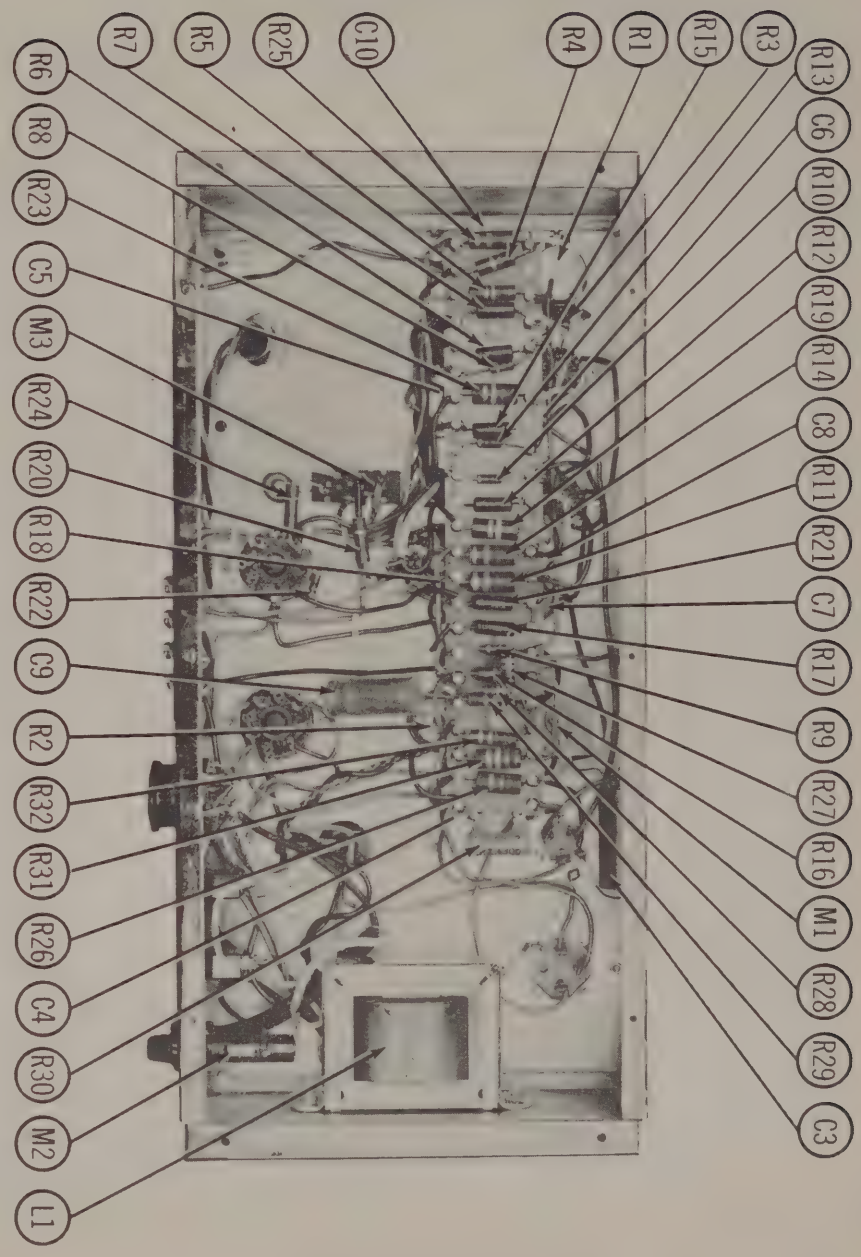
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			GROMMES PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	3A 250V			312003. (3AG 3A)	342001	AGC3	HKP

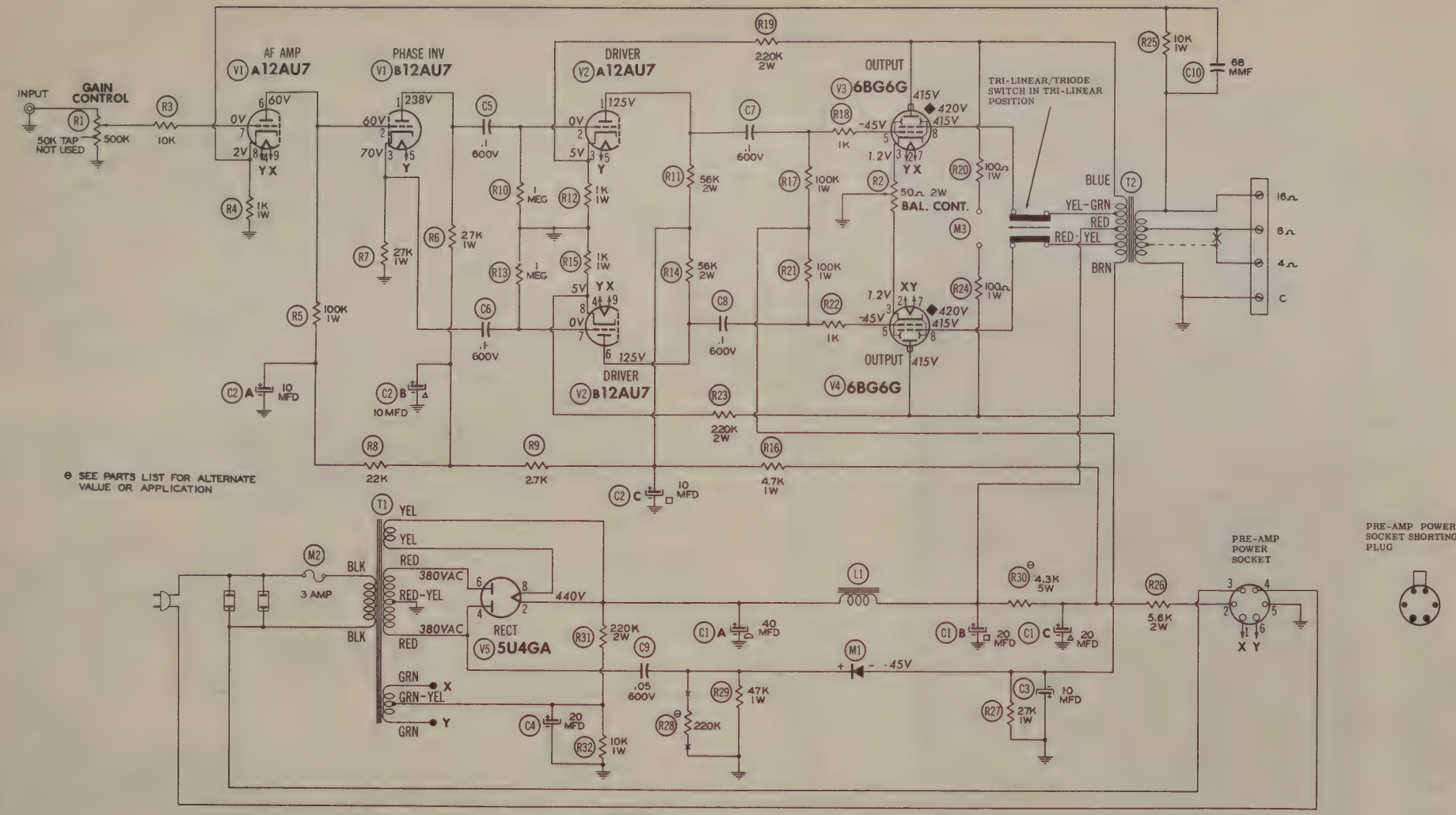
MISCELLANEOUS

ITEM No.	PART NAME	GROMMES PART No.	NOTES
M3	Switch		Triode-Tri-Linear (DPDT-Slide Type)

CHASSIS—BOTTOM VIEW



GROMMES MODEL 216BA



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AU7	† 38.7KΩ	† 133KΩ	27KΩ	10KΩ	10KΩ	† 133KΩ	10KΩ †† 510KΩ	1KΩ	10KΩ
V 2	12AU7	† 65KΩ	1Meg	1KΩ	10KΩ	10KΩ	† 65KΩ	1Meg	1KΩ	10KΩ
V 3	6BG6G	NC	10KΩ	25Ω	TP	125KΩ	TP	10KΩ	†♦ 350Ω † 150Ω	TOP CAP 1240Ω
V 4	6BG6G	NC	10KΩ	25Ω	TP	125KΩ	TP	10KΩ	†♦ 350Ω † 150Ω	TOP CAP † 240Ω
V 5	5U4GA	NC	40KΩ	NC	42Ω	NC	42Ω	NC	40KΩ	

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

TRI-LINEAR - TRIODE SWITCH IN TRI-LINEAR POSITION UNLESS DESIGNATED OTHERWISE.
♦ - MEASURED WITH TRI-LINEAR - TRIODE SWITCH IN TRIODE POSITION.
† - MEASURED FROM PIN 2 OF V5.
†† - GAIN CONTROL AT MAXIMUM.
TP TIE POINT.
NC - NO CONNECTION.

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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PHOTOFACT* Folder

*TRADE MARK

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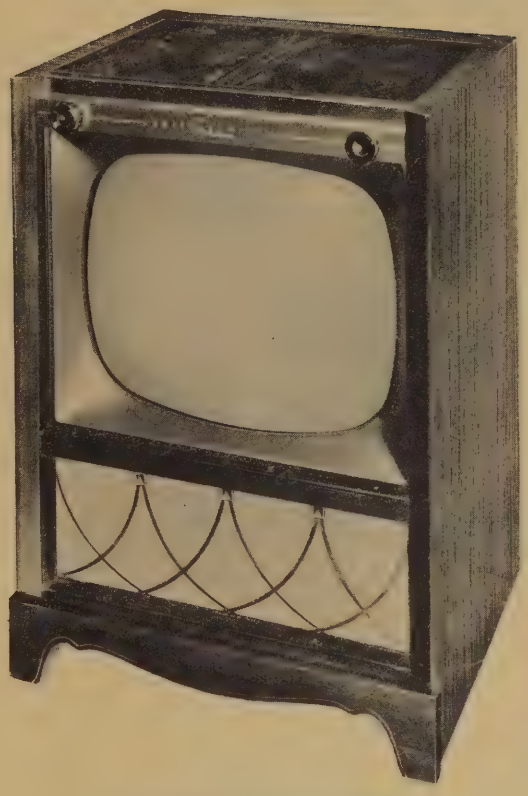

HALLICRAFTERS MODEL 24KT550M

TRADE NAME	Hallicrafters	MODELS	CHASSIS
		21KF520B, 21KF520M, 21KT540B, 21KT540M	A2000D
		21KF521B, 21KF521M, 21KT541B, 21KT541M	B2000D
		24KT550B, 24KT550M, 24TT510B, 24TT510M	C2000D
		24KT551B, 24KT551M, 24TT511B, 24TT511M	D2000D
MANUFACTURER	The Hallicrafters Co., 4401 W. 5th. Ave., Chicago 24, Illinois		
TYPE SET	Television Receiver		
TUBES	Seventeen		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.34 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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HALLICRAFTERS MODELS 21KF520B, M, 21KF521B, M, 21KT540B, M, 21KT541B, M, 24KT550B, M, 24KT551B, M, 24TT510B, M, 24TT511B, M (Ch. A2000D, B2000D, C2000D, D2000D)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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RETMA MEMBER

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.

2. Remove 3 wood screws holding metal name plate from front and remove 4 secondary control knobs now exposed.

3. Remove 5 wood screws and 1 metal screws. Remove rear cover.

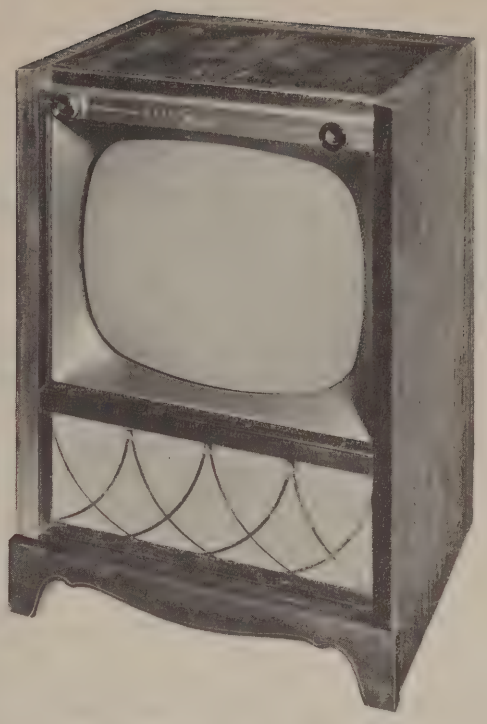
4. Remove 2 bolts and 2 wood screws holding control and tuner assembly to inside front of cabinet.

5. Disconnect picture tube socket, yoke plug, HV lead, speaker leads and ground wire.

6. Remove 2 wood screws holding interlock and antenna terminal bracket.

7. Remove 2 chassis bolts and 2 wood screws from chassis mounting bracket. Remove chassis with control and tuner assembly.

8. Remove 6 speaker nuts holding 2 speakers. Remove speakers.



MODEL	CHASSIS
21KF520B, 21KF520M, 21KT540B, 21KT540M	A2000D
21KF521B, 21KF521M, 21KT541B, 21KT541M	B2000D
24KT550B, 24KT550M, 24TT510B, 24TT510M	C2000D
24KT551B, 24KT551M, 24TT511B, 24TT511M	D2000D

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet to the right of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 4 wood screws holding plastic molding at the bottom edge of the safety glass. Remove molding and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

To adjust the horizontal oscillator, remove rear cover and supply power to the chassis. Set the horizontal hold control to the center of its range and adjust the horizontal frequency slug (L23) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the buzz control (R8) for maximum volume and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting the two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

HALLICRAFTERS MODELS 21KF520B, M, 21KF521B, M, 21KT540B, M, 21KT541B, M, 24KT550B, M, 24KT551B, M, 24TT510B, M, 24TT511B, M (Ch. A2000D, B2000D, C2000D, D2000D)

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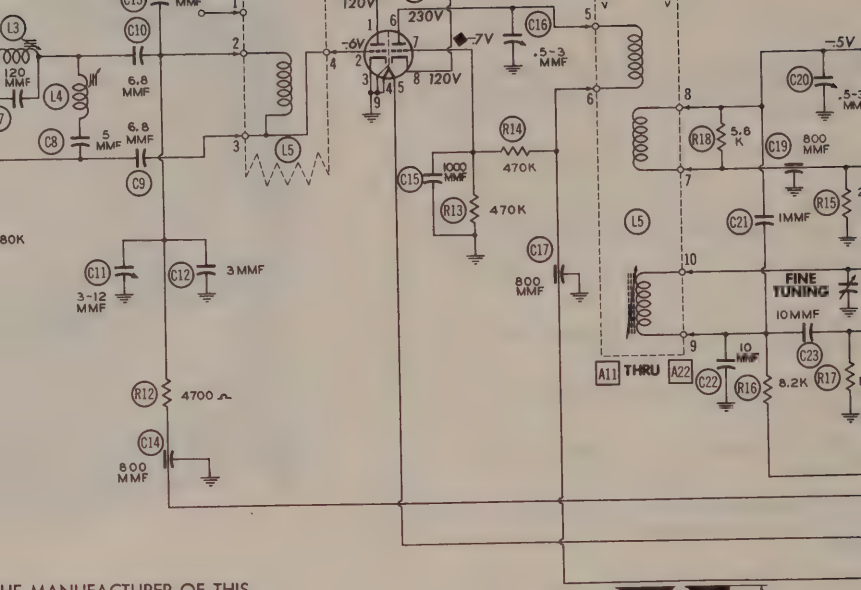
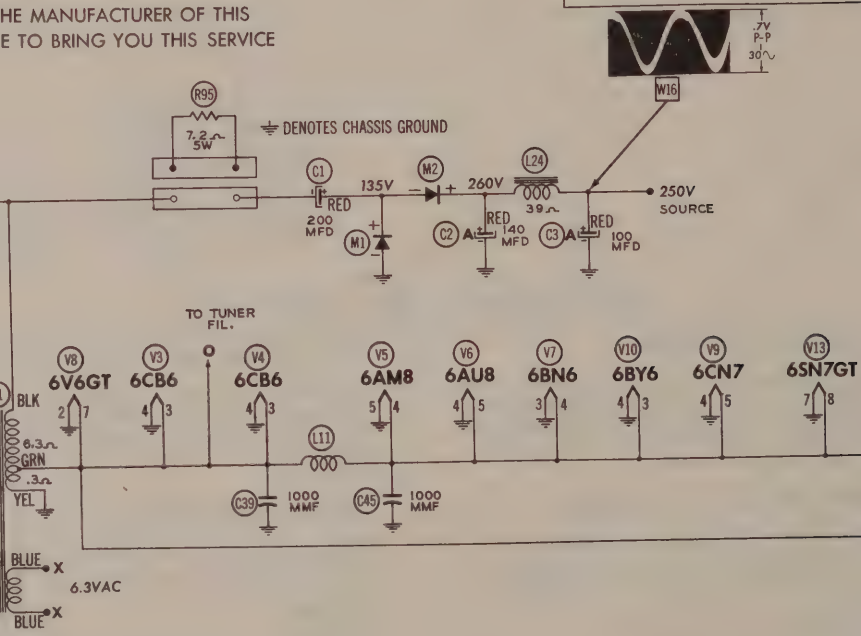


HE MANUFACTURER OF THIS
E TO BRING YOU THIS SERVICE



ONE OHM NOT
E PARTS LIST)

OCKWISE ROTATION
T END)

th vacuum tube
at 1,000 ohms

kwise direction

3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

A PHOTOFACT STANDA
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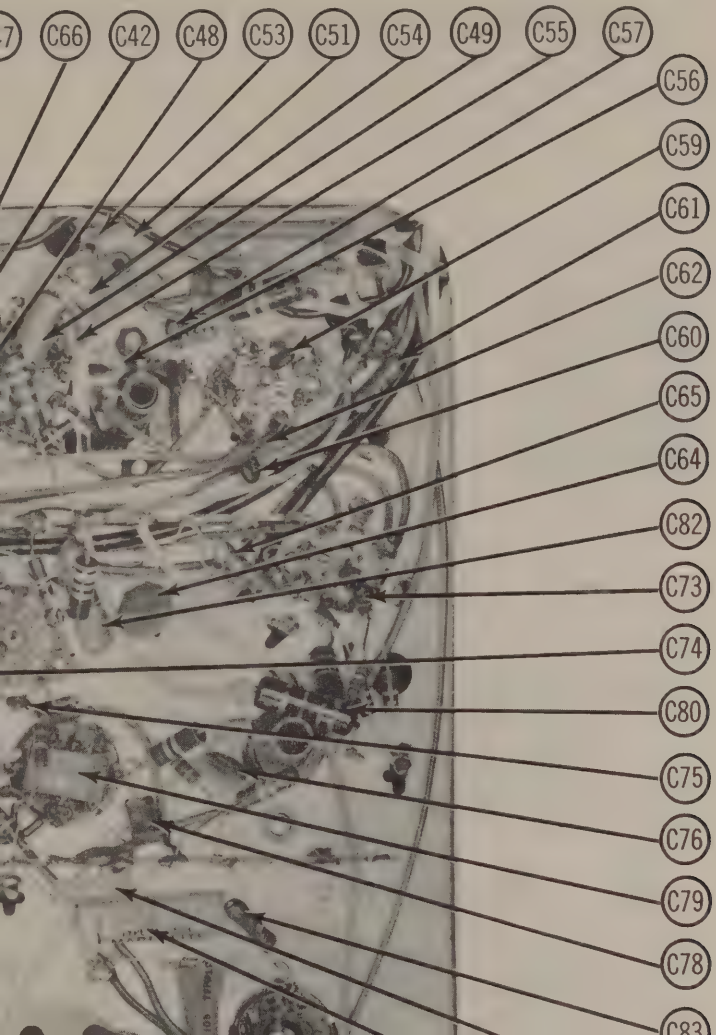
C66
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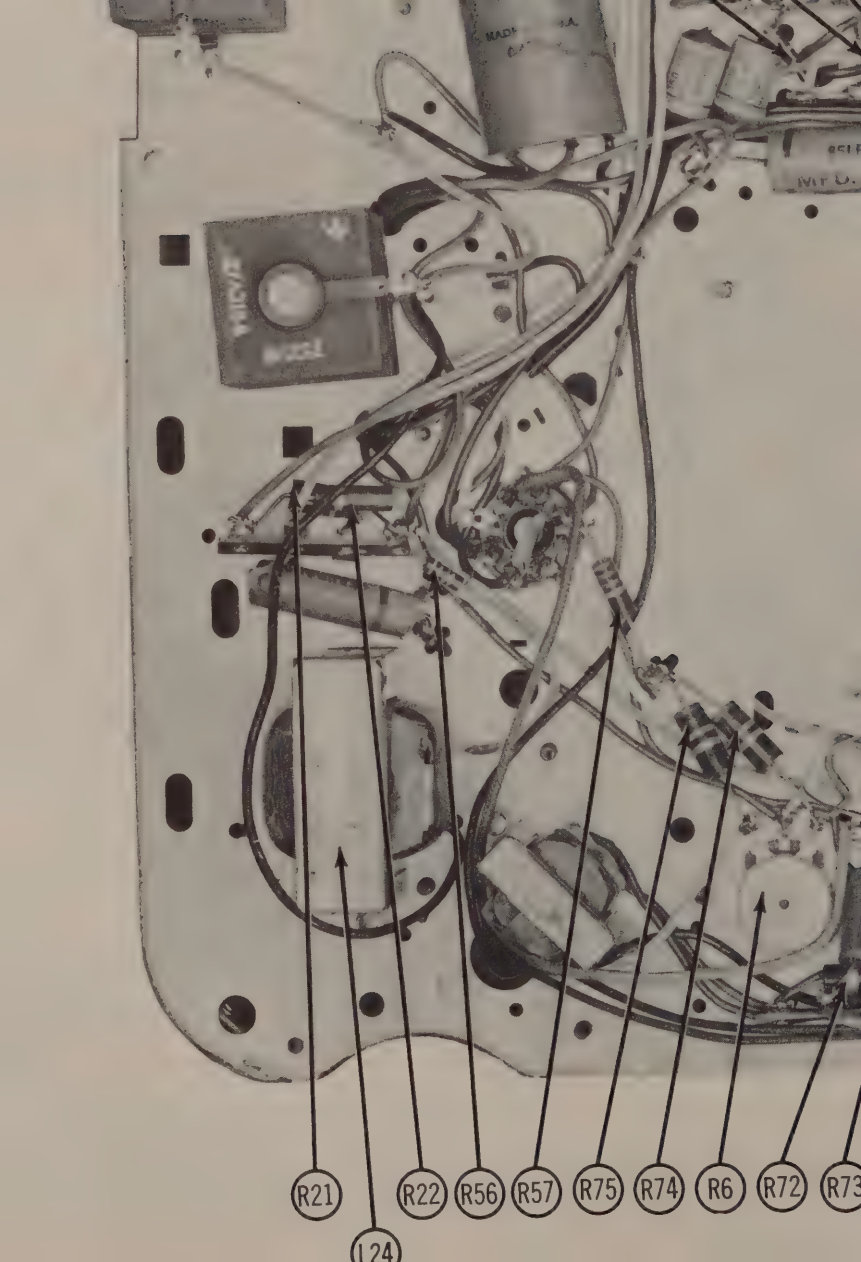
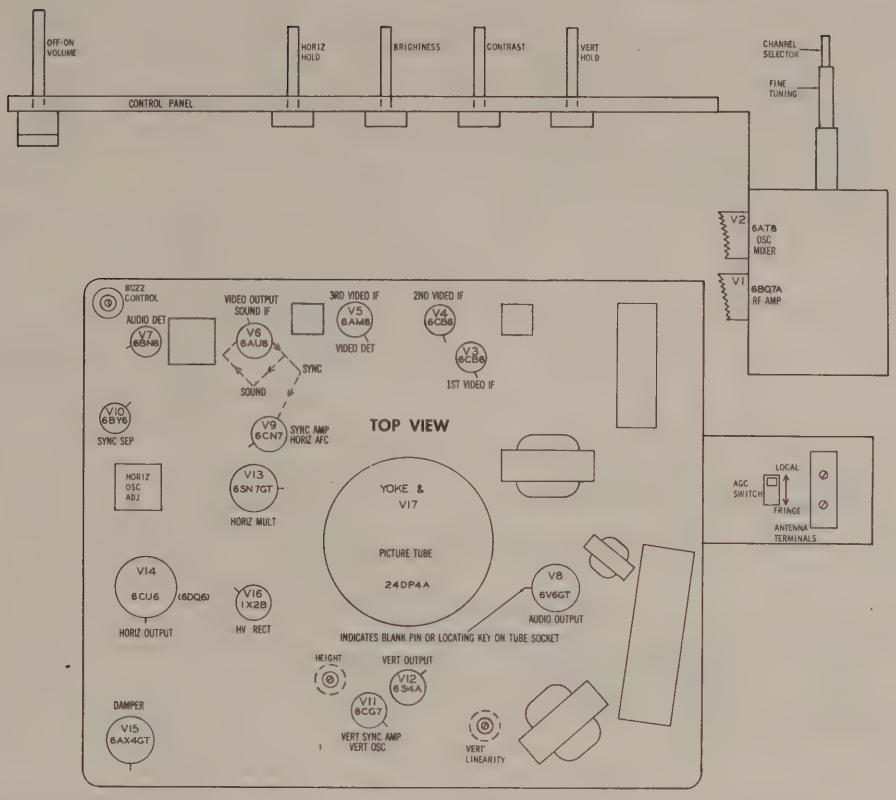

R21
L24
R22
R56
R57
R75
R74
R6
R72
R73

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V17**
Has pic, no sound - **V6, V7, V8**

SYNC FAILURE
No vert. sync - **V10, V11**
No horiz. sync - **V9, V10, V13**
No vert. or horiz. sync - **V9, V10**

SWEEP FAILURE
No raster, has sound - **V13, V14, V15, V16, V17**
No vertical deflection - **V11, V12**
Poor vert. linearity or foldover - **V11, V12**
Poor horiz. linearity or foldover - **V13, V14, V15**
Narrow picture - **V13, V14, V15, V16, M1, M2**
Vert. off freq. - **V10, V11**
Horiz. off freq. - **V10, V11**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage shock hazard may be eliminated by removing the 6AX4 (V15) damper tube and connecting a 2250 ohm 30 watt resistor from pin 5 of the 6AX4 to chassis.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C32. Connect the positive lead to chassis. Two peaks may occur during alignment of the video IF coils. Use the peak with the slug entering the coil from the end nearest the chassis.
The sound trap (A5) should be tuned with the slug entering the coil from the end away from the chassis.
Use only enough sweep generator output to provide usable pattern on scope. If the sweep generator has no built-in marker, loosely couple a separate marker to the sweep generator output.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.01MFD	High side to point (B). Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC	Between any two channels	Vert. Amp. thru detector probe (Fig. 1) to pin 5 (plate) of 1st. video IF amp. (V3). Low side to chassis.	A1, A2	Adjust A1 and A2 for response curve similar to Fig. 2 with markers in proper positions. Remove scope and detector from pin 5 of V3.
2.	"	"	"	41.25MC 42.5MC 45.75MC	"	Vert. Amp. thru 3.3KΩ to point (A). Low side to chassis.	A3, A4, A5, A6	Adjust for response curve similar to Fig. 3. Adjust A5 for MINIMUM amplitude at 41.25MC. A3 affects the high frequency end of the response curve and A4 affects the low frequency side. A6 affects the center of the response curve. Adjust A6 for maximum amplitude and MINIMUM tilt.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	.001MFD	High side to point (A). Low side to chassis.	Not used	4.5MC (400%Mod)	Between any two channels	Vert. Amp. thru detector (Fig. 4) to pin 11 (cathode) of picture tube. Low side to chassis.	A7	Turn contrast control fully clockwise. Adjust A8 completely out of coil. Then adjust A7 for MINIMUM 400% indication on scope.

SOUND IF ALIGNMENT

Set the volume control for normal volume.
Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (400%Mod) 50KC Swp)	4.5MC	Between any two channels	Across secondary of audio output transformer	A10	Set buzz control (R8) 90° from maximum clockwise rotation. Adjust A10 for maximum 400% indication on scope.
5.	"	"	"	"	"	"	A8, A9	Attenuate generator output so that signal level is below the limiting level of the 6BN6 as evidenced by background hiss and noise. Adjust A8 and A9 for maximum response on scope.
6.	"	"	Not used	4.5MC (400%Mod)	"	"	R8	Use high generator output and adjust R8 for MINIMUM 400% indication on scope.
7.	"	"	4.5MC (400%Mod) 50KC Swp)	4.5MC	"	"	A10	With volume control at low level, retouch A10 for maximum 400% indication on scope. Remove test equipment. Connect antenna and tune in weakest station in that area and retouch R8 for MINIMUM buzz and hiss. Tune in strongest TV station in that area and adjust A10 for clearest sound.

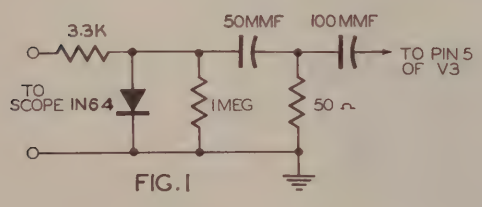


FIG. 1

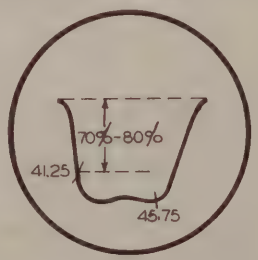


FIG. 2

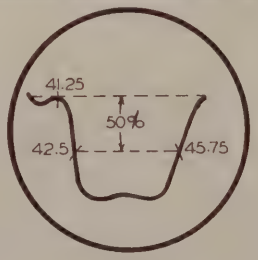


FIG. 3

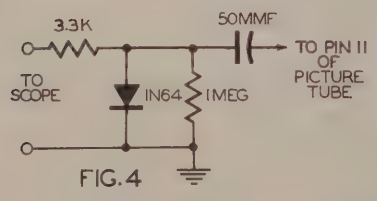


FIG. 4

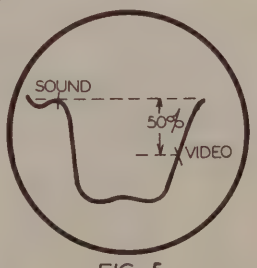


FIG. 5

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT FOR TUNER #1D2559

Leave the bias connected as under "Video IF Alignment". Remove the 2250 ohm resistor from the cathode circuit of V15 and replace the 6AX4 in its socket.
The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 3.3KΩ to point (A). Low side to chassis.	A11	Adjust to place sound markers in trap notch as in Fig. 5. Video marker should fall at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A12	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A13	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A14	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A15	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A16	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A17	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A18	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A19	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A20	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A21	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A22	

RF AND MIXER ALIGNMENT FOR TUNER #1D2559

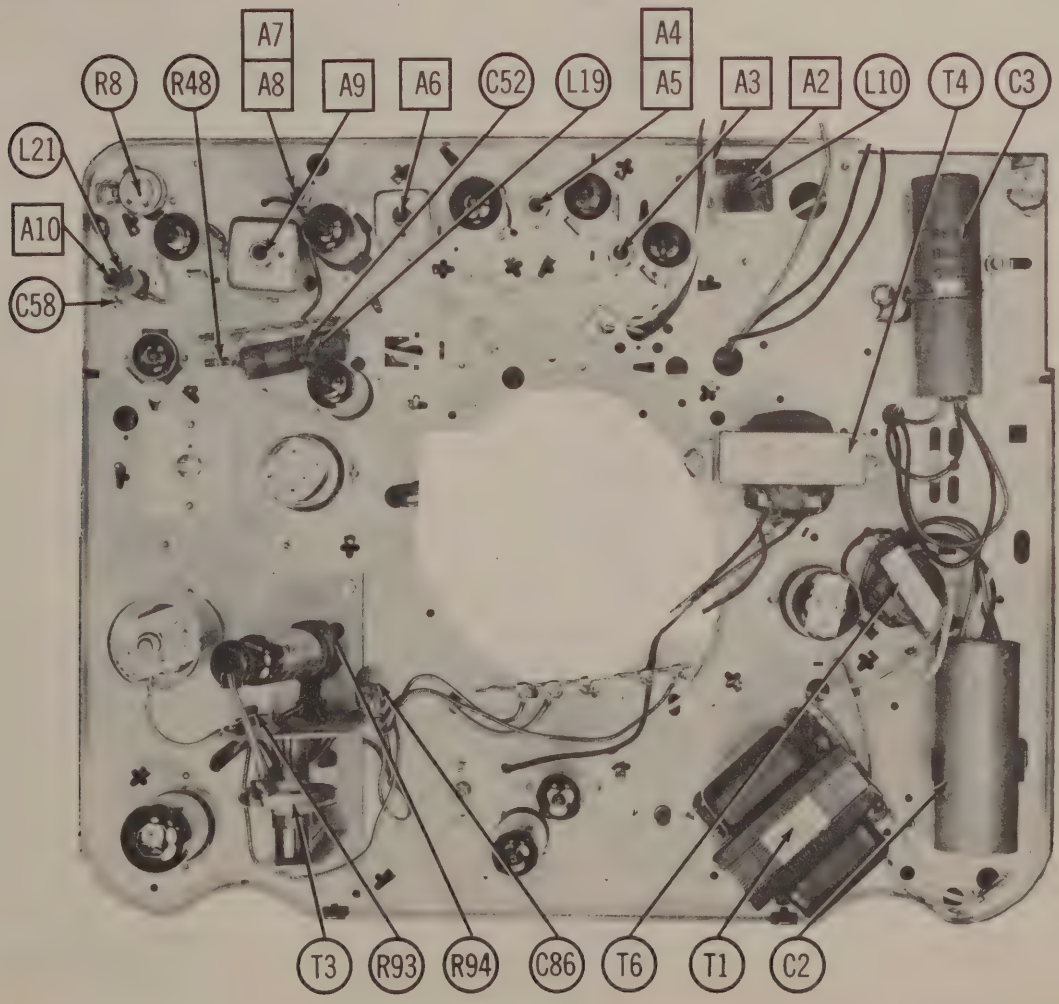
The RF and Mixer portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

VHF TUNER ALIGNMENT FOR TUNER #1D2480

The VHF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

UHF TUNER ALIGNMENT FOR TUNER #1D2480

The UHF tuner portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver is not recommended in the field.

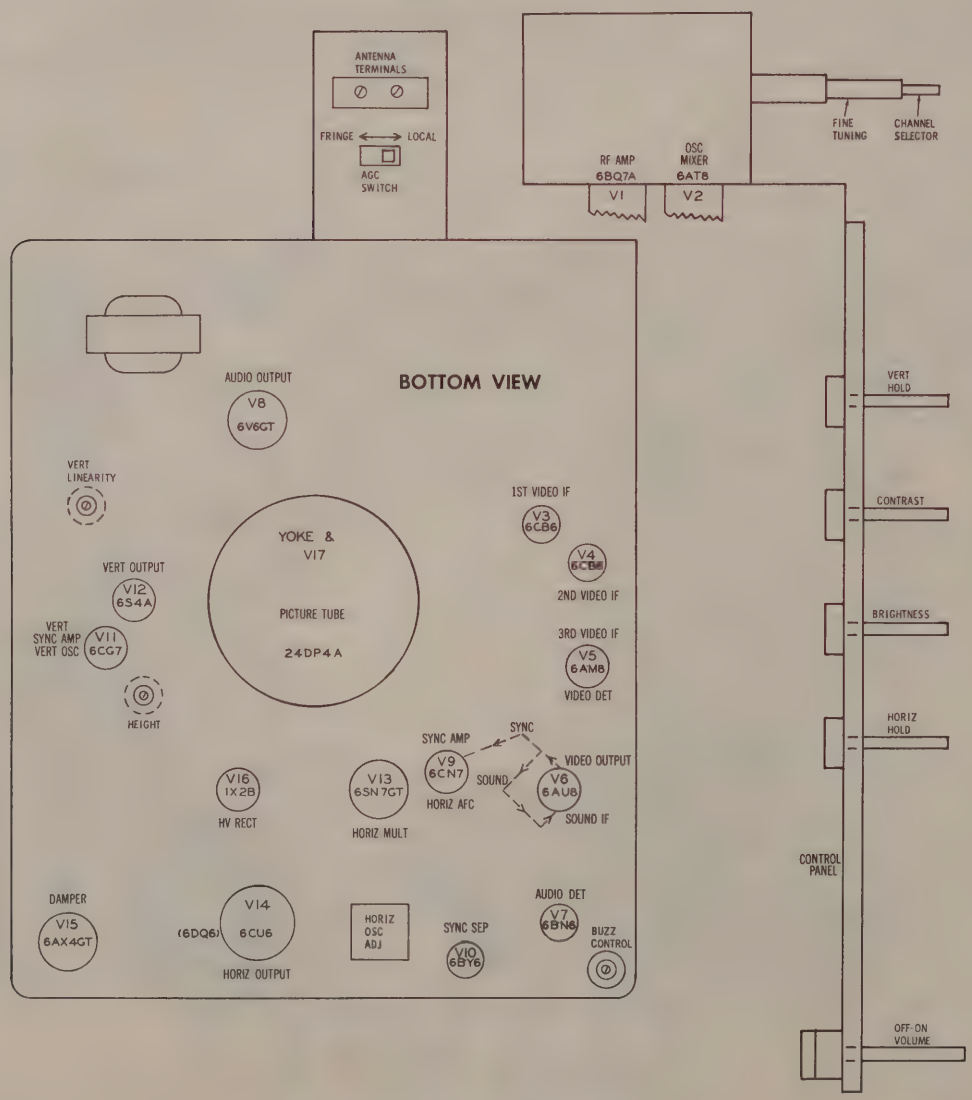


CHASSIS TOP VIEW

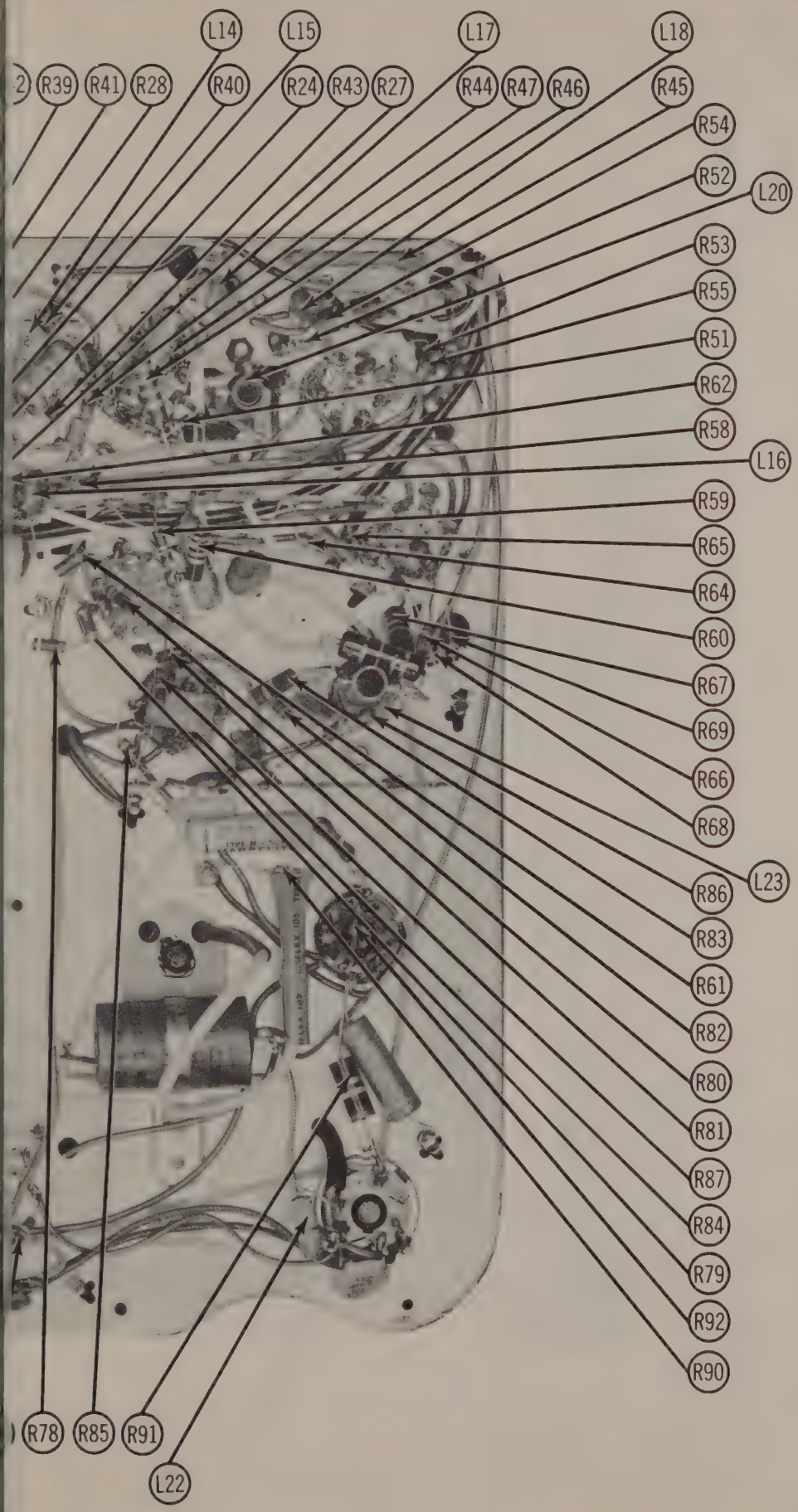
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	3Meg	0Ω	0Ω	. 1Ω	† 2. 2KΩ	200KΩ	INF	0Ω
V 2	6AT8	10KΩ	† 17KΩ	0Ω	0Ω	. 1Ω	† 27KΩ	† 60KΩ	0Ω	220KΩ
V 3	6CB6	1. 5Meg	47Ω	. 1Ω	0Ω	▲ 750Ω	▲ 750Ω	0Ω		
V 4	6CB6	90KΩ	INF	. 1Ω	0Ω	† 1KΩ	† 1KΩ	0Ω		
V 5	6AM8	180Ω	12KΩ	† 12KΩ	. 1Ω	0Ω	† 13KΩ	. 2Ω	4. 7KΩ	0Ω
V 6	6AU8	0Ω	100KΩ	† 55KΩ	0Ω	. 1Ω	90Ω	1Meg	† 47KΩ	† 7. 5KΩ
V 7	6BN6	300Ω	. 3Ω	0Ω	. 1Ω	† 22KΩ	5. 3Ω	▲ 1Meg		
V 8	6V6GT	TP	0Ω	† 1. 1KΩ	† 500Ω	500KΩ	NC	. 1Ω	680Ω	
V 9	6CN7	4. 7KΩ	2Meg	1Meg	0Ω	. 1Ω	100Ω	8KΩ	† 39KΩ	0Ω
V 10	6BY6	300KΩ	0Ω	. 1Ω	0Ω	† 120KΩ	† 25KΩ	1. 5Meg		
V 11	6CG7	▲ 3Meg	450KΩ	0Ω	0Ω	. 1Ω	† 9KΩ	1. 2Meg	0Ω	0Ω
V 12	6S4A	NC	7KΩ	▲ 3Meg	0Ω	. 1Ω	▲ 3Meg	NC	NC	▲ 1. 3KΩ
V 13	6SN7GT	150KΩ	† 120KΩ	1KΩ	3Meg	† 15KΩ	11KΩ	0Ω	. 1Ω	
V 14	6CU6	TP	. 1Ω	NC	† 10KΩ	470KΩ	NC	0Ω	0Ω	TOP CAP ▲ 22Ω
V 15	6AX4GT	NC	TP	350KΩ	NC	† 39Ω	NC	350KΩ	350KΩ	
V 16	1X2B		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 220Ω
V 17	24DP4A	0Ω	0Ω	PIN 6 0Ω	PIN 10 ▲ 220KΩ	PIN 11 † 300KΩ	PIN 12 . 1Ω			

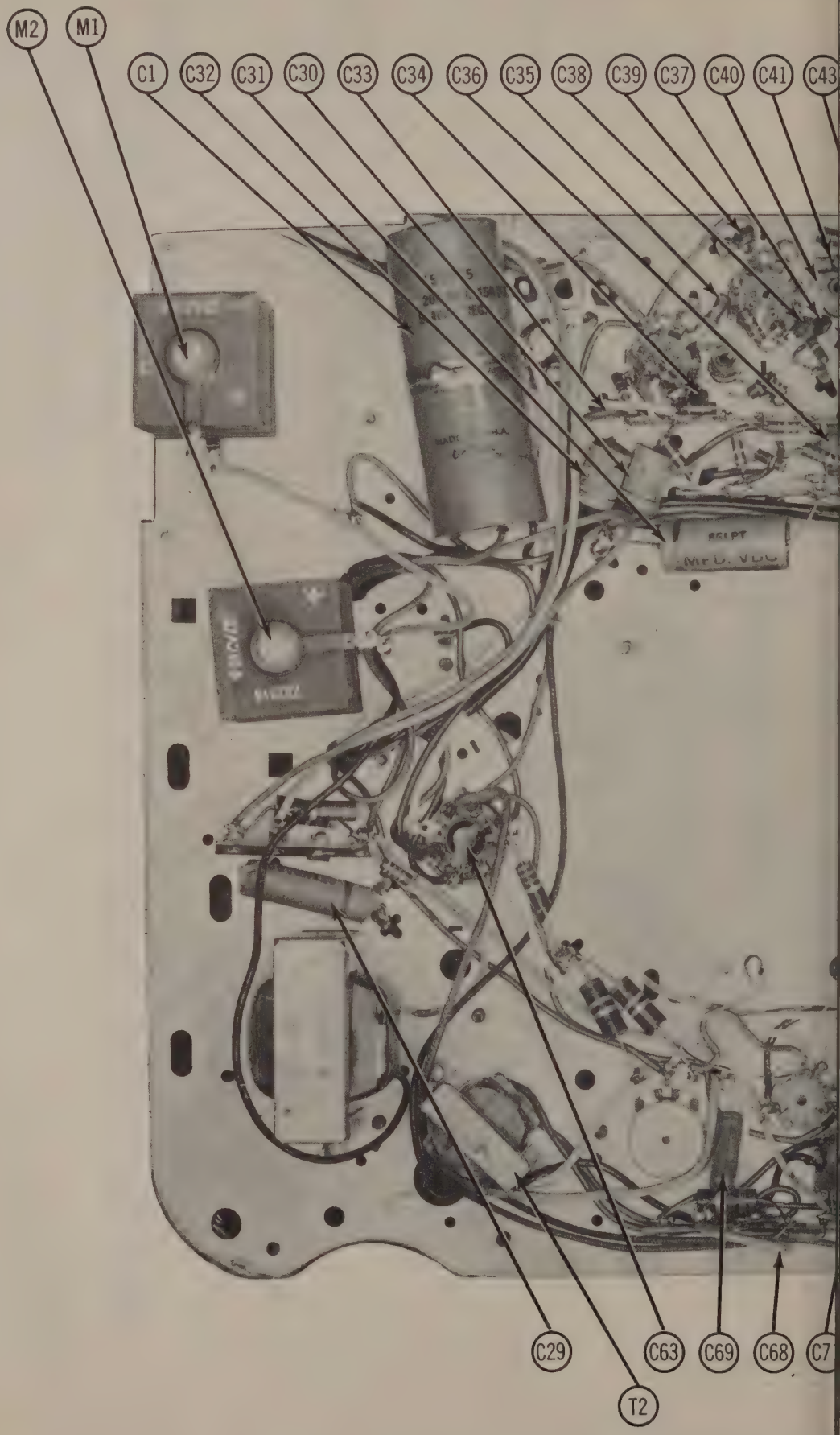
† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V15.
▲ MEASURED FROM PIN 2 OF V4.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART

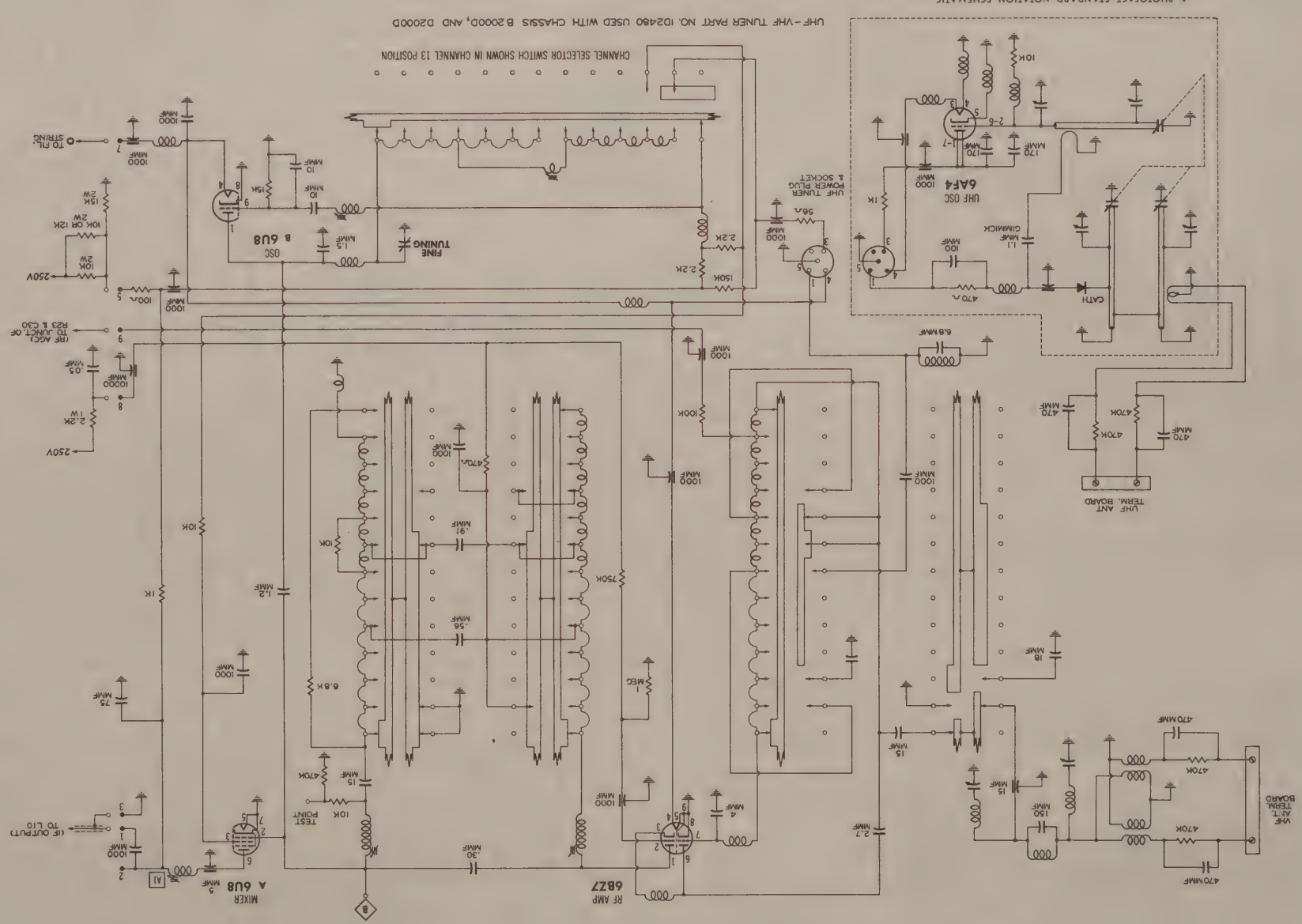


AND INDUCTOR IDENTIFICATION



CHASSIS BOTTOM VIEW-CAPAC

ALTERNATE VHF-UHF TUNER SCHEMATIC



TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: Hallicrafters PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amp.	6BQ7A	6BQ7A	
V2	Mixer-Osc.	6AT8	6AT8	
V3	1st Video IF Amp.	6CB6	6CB6	
V4	2nd Video IF Amp.	6CB6	6CB6	
V5	3rd Video IF Amp. - Video Det.	6AM8	6AM8	
V6	Video Output-Sound IF Amp.	6AU8	6AU8	
V7	Audio Det.	6BN6	6BN6	
V8	Audio Output	6V6GT	6V6GT	
V9	Sync Amp. -Horiz. AFC	6CN7	6CN7	
V10	Sync Sep.	6BY6	6BY6	
V11	Vert. Osc. -Vert. Sync Amp.	6CG7	6CG7	
V12	Vert. Output	6S4A	6S4A	
V13	Horiz. Mult.	6SN7GT	6SN7GT	
V14	Horiz. Output	6CU6	6CU6	6DQ6 may be used in some versions.
V15	Damper	6AX4GT	6AX4GT	
V16	HV Rect.	1X2B	1X2B	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Hallicrafters PART No.	REPLACEMENT DATA: CBS PART No.	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	REPLACEMENT DATA: SYLVANIA PART No.	NOTES
V17	24DP4A ① 21ALP4A ①	24DP4A ① 21ALP4A ① 21ALP4B ① 21ALP4	24DP4A ① 21ALP4A ① 21ALP4A/B ① 21ALP4	24DP4A ② 21ALP4A/B ②	① Aluminized ② Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: Hallicrafters PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	200	150	45B265	PR2-100	E210408	WS342	TD-200-200	D-100	R1467
C2A	140	300	45-327	RE-1031		WQ401		Q-225	R2185
B	4	300						T-030	
C	4	150							
D	50	150							
C3A	100	300	45-328	RE-1032	C152	FP389.1	TM-3137	T-537	R2184
B	10	300							
C	20	25							
C4	20	450	45B261	PRS450V20	BR2045	TC75	TD-20-450	FM-4520	TVA-1709

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	470	500	47X20B471M	SI-470	D6-471	5W5T47	GP2K-471	MCL347	1FM-347	
C6	470	500	47X20B471M	SI-470	D6-471	5W5T47	GP2K-471	MCL347	1FM-347	
C7	120			NPO-DI120	DD-121	TZ-32	811-121	UC-5312	5GA-T12	
C8	5			NPO-DI5	TCZ-4R7	Z011	NPOA-050	ZT-555	5TCCB-V47	
C9	6.8			NPO-DI6.8	TCZ-6R8	Z013	NPOA-6R8	ZT-5568	5TCCB-V68	
C10	6.8			NPO-DI6.8	TCZ-6R8	Z013	NPOA-6R8	ZT-5568	5TCCB-V68	
C11	3-12									
C12	3			NPO-DI3	TCZ-3R3	Z007	NPOA-030	ZT-553	5TCCB-V3	
C13	2.2			NPO-SI2.2	TCZ-2R2	Z006	NPOA-2R2		5TCCB-V22	
C14	800									
C15	1000			BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C16	.5-3				829-3		3139-01-0R5	CT565A		
C17	800									
C18	800									
C19	800									
C20	.5-3				829-3		3139-01-0R5	CT565A		
C21	1			NPO-SI1	TCZ-1	TZ03	NPOA-010		5TCCB-V1	
C22	10									
C23	10									
C24	1000			BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C25	1000			BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C26	39			NPO-DI39	TCZ-39	Z031	NPOL-390		5TCC-Q39	
C27	800									
C28	1000			BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C29	.05	400	46AU503J	BPD-005	DF-503	CUB4S5		PT415	4TM-S5	
C30	.1	150	46A243	P288N-1	DF-104	CUB2P1		PT201	2TM-P1	
C31	.5	100	46A177	P288N-5		CUB2P5		PT205	68P20	
C32	.1	150	46A243	P288N-1	DF-104	CUB2P1		PT205	2TM-P1	
C33	5000		47A168	BPD-005	DD-502	K069	811-005	DC525	5HK-D5	
C34	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C35	24		47CA20A240J	NPO-SI25	TCZ-24	TZ15	NPOL-240	ZT5425	5TCC-Q25	
C36	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C37	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C38	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C39	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C40	39			NPO-DI39	TCZ-39	TZ20	NPOL-390		5TCC-Q39	
C41	15		47CA20A150J	NPO-SI39	TCZ-15	TZ11	NPOK-150		5TCC-Q15	
C42	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C43	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C44	5000		47A168	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C45	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C46	10		47CA20100F	N750-SI10	TCN-10	TN01	N750A-100	NT-541	5TCU-Q1	
C47	.1	150	46A243	P288N-1	DF-104	CUB2P1		PT201	2TM-P1	
C48	270		47X20D271K	NPO-SI270	D6-270	TZ39	811-271		10GA-T27	
C49	.0082	400	46AU822E	P488N-008	DI6-802	CUB16D8		PT1628	6TM-D8	
C50	560		47CA25A561K	1464-00068	D6-561	1R5T56	811-561		10GA-T56	
C51	68		47B479							
C52	.1	400	46AV104J	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C53	5		47A160-6	NPO-SI10	TCZ-4R7	Z011	NPOA-050	ZT-555	5TCCB-V47	
C54	33		47B478	N080-SI33						
C55	47		47CA20A470M	SI-47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C56	2.4		47-599	NPO-SI2.2	TCZ-2R2	TZ05	NPOA-2R2		5TCCB-V22	
C57	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C58	15		47B480							
C59	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C60	1000		47A230	BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C61	470		47CA25A471M	SI-470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C62	10000		47A224	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C63	2000			BPD-002	DD-202	K072	801-002	DC522	5HK-D2	Note 1
C64	10000		47A224	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C65	470		47CA25A471M	SI-470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C66	.1	150	46A243	P288N-1	DF-104	CUB2P1		PT201	2TM-P1	
C67	10000		47A224	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	

PARTS LIST AN
CAPACIT

ITEM No.	RATING: CAP.	RATING: VOLT	Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.
C68A	4700		† 49A044	PA-383	†PC-106
B	4700				
C69	.01	400	46BR103E4	BPD-01	D6-103
C70	470		47CA25A471M	1464-00047	
C71	.047	400	46BR473E4	BPD-05	DF-503
C72	5000		47A168	BPD-005	DD-502
C73	68		47CA20A680M	SI-68	D6-680
C74	75		47CA20A750K	NPO-SI75	TCZ-75
C75	1000		47A586	BPD-001	DD-102
C76	1000			BPD-001	DD-102
C77	.1	400	46AT104J	P488N-1	DF-104
C78	100	500	47X20B101K	1469-0001	TCZ-100
C79	270	500	47CA20A271K	1469-00027	TCZ-270
C80	.0039	400	46BR392E4	1464-0039	
C81	680	500	47X20B681K	1464-00068	D6-681
C82	.0068	400	46AU682E	BPD-0068	D6-682
C83	470		47CA25A471M	1464-00047	D6-471
C84	.047	400	46BR473L4	BPD-05	DF-503
C85	56	3000	47A555		
C86	.068	200	46AU683F	P288N-068	
C87	47	2000			
C88	.005	1000		HVD-15-4700	DD16-502
C89	68	2000			

Note 1. Some versions may use a .02MFD ③ 600V unit (Part No
Note 2. Not used in some versions.
Note 3. Used in chassis B2000D and D2000D only.
† Items C68A, C68B, R73A, R73B are combined in one unit.

CONT

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Hallicrafters PART No.	CENTRALAB PART No.	CLAROS PART N
R1A	1Meg	½	25B1233	B-70-S	A47-1Me
B	Shaft		Not Req.	Not Req.	FS-3
C	Switch		Not Req.	Not Req.	SWE-12
R2A	15KΩ	½	25B1232	AB-22	A47-15K
B	Shaft		Not Req.	AK-4	KSS-3
R3	5Meg	½	25B1148		
R4	1400Ω	½	25B1234		
R5A	1.25Meg with 250K stop	½	25B1177	† AB-69	† A47-1M
B	Shaft		Not Req.	AK-4	KSS-3
R6A	750Ω	½	25B1099	AB-5	A47-750
B	Shaft		Not Req.	AK-19	RN-3
R7A	5Meg with 1Meg stop	½	25B1098	* AB-86	* A47-4M
B	Shaft		Not Req.	AK-19	RN-3
R8	500Ω	2	25A1095		39-500

† Connect a 240KΩ resistor in series with the left hand termina the original control (control viewed from shaft end, terminals
* Connect a 1Meg resistor in series with the right hand termina the original control (control viewed from shaft end, terminals

RESISTO

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Hallicrafters PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R9	470KΩ	½	23X20X474K	BTS-470K	
R10	470KΩ	½	23X20X474K	BTS-470K	
R11	680KΩ	½		BTS-680K	
R12	4700Ω	½		BTS-4700	
R13	470KΩ	½		BTS-470K	
R14	470KΩ	½		BTS-470K	
R15	220KΩ	½		BTS-220K	
R16	8200Ω	½			
R17	10KΩ	½			
R18	5600Ω	½			
R19	15KΩ	½		BTS-15K	
R20	47KΩ	½			
R21	12KΩ	2	23X40X123K	BTB-12K	
R22	2200Ω	1	23X30X222K	BTA-2200	
R23	2.2Meg	½	23X20X225K	BTS-2.2Meg	
R24	270KΩ	½	23X20X274K	BTS-270K	
R25	15Meg	½	23X20X156K	BTS-15Meg	
R26	6.8Meg	½	23X20X685K	BTS-6.8Meg	
R27	270KΩ	½	23X20X274K	BTS-270K	
R28	330KΩ	½	23X20X334K	BTS-330K	
R29	620KΩ 5%	½		BTS-620K 5%	
R30	1.2Meg	½	23X20X125K	BTS-1.2Meg	
R31	4700Ω	½	23X20X472K		
R32	680Ω	½	23X20X681K	BTS-680	
R33	47Ω	½	23X20X470K	BTS-47	
R34	150KΩ	½	23X20X154K	BTS-150K	
R35	150KΩ	½	23X20X154K	BTS-150K	
R36	18KΩ	½	23X20X183K		
R37	1000Ω	½	23X20X102K	BTS-1000	
R38	47Ω	½	23X20X470K	BTS-47	
R39	12KΩ	½	23X20X123K		
R40	1000Ω	½	23X20X102K	BTS-1000	
R41	180Ω	½	23X20X181K	BTS-180	
R42	12KΩ	2	23X40X123K	BTB-12K	
R43	4700Ω	½	23X20X472K	BTS-4700	
R44	1Meg	½	23X20X105K	BTS-1Meg	
R45	7500Ω	5	24A1058	PW7-7500	
R46	47KΩ	1	23X30X473K	BTA-47K	
R47	56Ω	½	23X20X560K	BTS-56	
R48	100KΩ	½	23X20X104K	BTS-100K	
R49	220KΩ	½	23X20X224K	BTS-220K	
R50	820KΩ	½	23X20X824K	BTS-820K	
R51	100KΩ	½	23X20X104K	BTS-100K	
R52	33KΩ	½	23X20X333K	BTS-33K	
R53	680Ω	½	23X20X681K	BTS-680	

† Items C68A, C68B, R73A, R73

ONS

MALLORY PART No.	SPRAGUE PART No.	NOTES
-5247	5HK-D47	
-5247	5HK-D47	
411	4TM-S1	
	MS-347	
4147	4TM-S47	
525	5HK-D5	
C-5468	56A-Q68	
T-5475	5TCC-Q75	
C521	5HK-D1	
C521	5HK-D1	
T401	4TM-P1	
CB235	MS-31	
	MS-327	
	MS-239	
	MS-368	
	6TM-D68	
	MS-347	
T4147	4TM-S47	
T416	4TM-S68	
	20GA-Q47	Note 2
T1625	1DHK-D47	Note 3

ion.

ORY No.	INSTALLATION NOTES
	Volume
q.	Attach to R1A.
	Attach to R1A.
	Horiz. Hold
q.	Attach to R2A.
	Brightness
	Contrast Tapped at 1200Ω
	Vert. Hold
eq.	Attach to R5A.
51L	Vert. Linearity
eq.	Attach to R6A.
355L	Height
eq.	Attach to R7A.
	Buzz-Wire Wound

d connecting to the same terminal of

d connecting to the same terminal of

REPLACEMENT DATA		NOTES
Hallicrafters PART No.	IRC PART No.	
	BTB-22K	

TRANSFORMER (FILAM

ITEM No.	RATING				REPLA		
	PRI.	SEC. 1	SEC. 2	SEC. 3	Hallicrafters PART No.	Halldorson PART No.	P
T1	117VAC ③ 1.34A Tap ⓐ 6.3V ⓐ 7.4A	6.3V ③ 1.2A			52380-B		

① Parallel and phase two 6.3V ③ 3.5A windings tape one 6.3V ③ 3.5A windi
② Tape 25V tap.

TRANSFORMERS (SWEEP CIRC

ITEM No.	USE	REPLACEMENT				
		Hallicrafters PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	P
T2	Vert. Osc. Trans.	55B250	B6704	A-3006		V
T3	Horiz. Output Trans.	55-281	FB418 *	HVO-37 *		X
T4	Vert. Output Trans.	55B260	Z1807	A-2824		
T5A	Yoke 90°Horiz.(21MH)	53-363	DF607 ①②	MDF-92 ① ②	235D1 ①②	Y
B	Vert. (34MH)					

① Use original horizontal damping network.
② Jumper terminals #1 and #8.

*HORIZONTAL OUTPUT TRANSFORMER CO

Use Original Width Coil Unless Replacement Ty

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replaceme Connectio
	4	6	6		3
	5	3	3		7
	2	5	5		2
	6	2	2		6

TRANSFORMER (AUDIO OU

ITEM No.	IMPEDANCE		REPLACEMENT DATA				
	PRI.	SEC.	Hallicrafters PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordar PART
T6	9.6KΩ	3-4Ω	55-282	Z1005 ①	A2998	A3879 ①	24S52

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		
	SIZE	FIELD	V. C. IMP.	Hallicrafters PART No.	QUAM PART No.	RCA TYPE No.
SP1	8"	PM	3-4Ω	85C181 ①	8A21	208S2
	6"	PM	3-4Ω	85C177 ②	6A1	224S1
SP2	4"	PM	3-4Ω	85C175 ③	4A07	223S1

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DA		
		PRI.	SEC.	Hallicrafters PART No.	MEISSNER PART No.	
L1	Ant. Matching Trans.	0Ω	0Ω			

PARTS LIST AND DESCRIPTIONS (Continued)

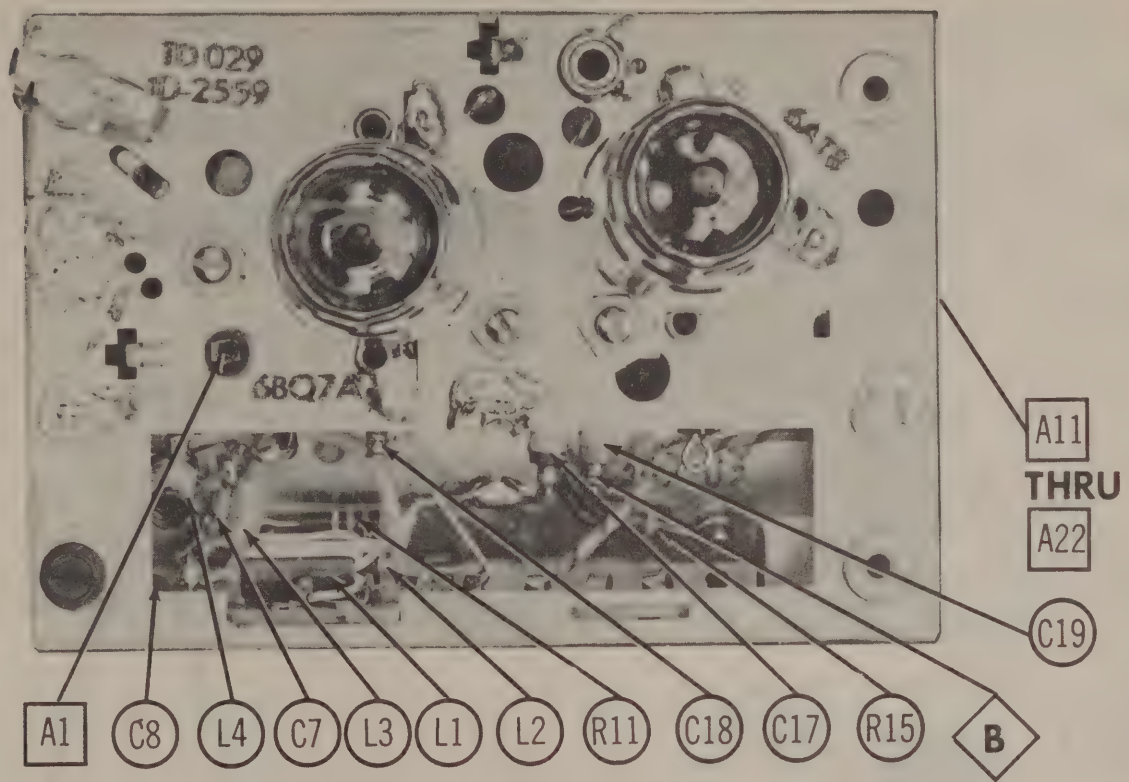
SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Hallicrafters PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.230A	27A218-B	1236A	MR300	6S300	6Q4	300	
M2	.230A	27A218-B	1236A	MR300	6S300	6Q4	300	

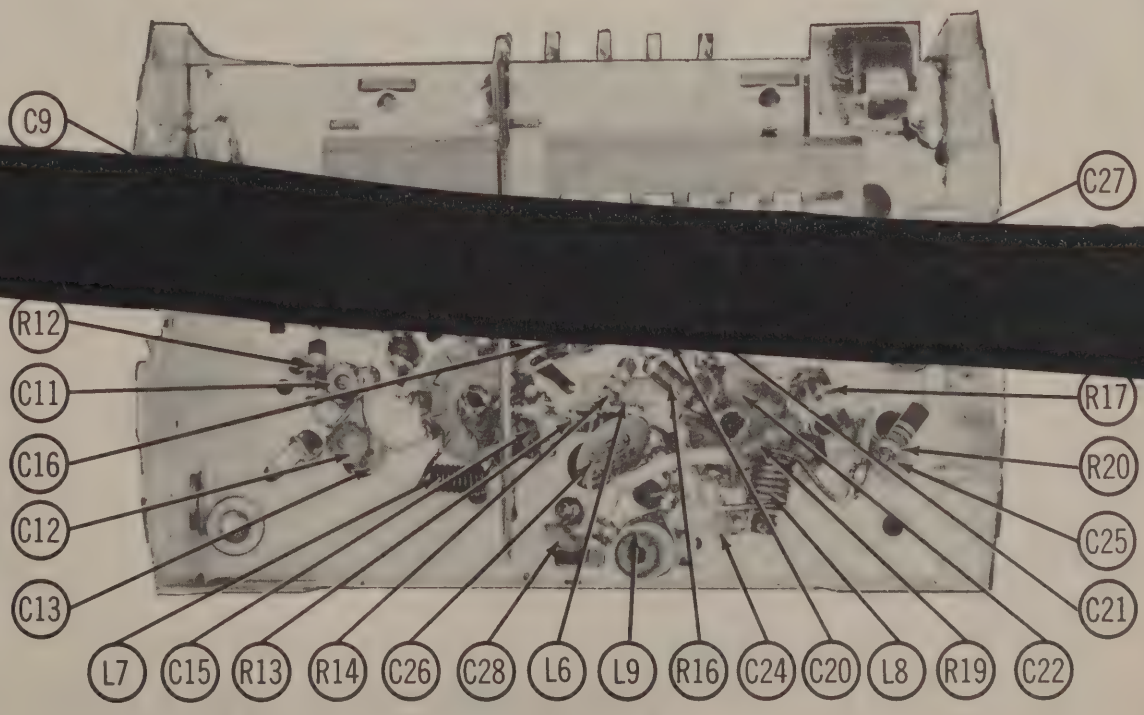
MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M3	Tuner	1D2559	VHF - Chassis A2000D, C2000D
M4	Tuner	1D2480	VHF-UHF - Chassis B2000D, D2000D
M5	Switch	60B737	Fringe (SPDT - Slide Type)
M6	Centering Device	21B216	
M7	Ion Trap	21B189	
	Cabinet	78-1259	Models 21KT540M, 21KT541M
	Cabinet	78-1260	Models 21KT540B, 21KT541B
	Cabinet	78-1257	Models 21KF521M, 21KF520M
	Cabinet	78-1258	Models 21KF521B, 21KF520B
	Cabinet	78-1255	Models 24TT510M, 24TT511M
	Cabinet	78-1256	Models 24TT510B, 24TT511B
	Cabinet	78-1261	Models 24KT551M, 24KT550M
	Cabinet	78-1262	Models 24KT551B, 24KT550B
	Knob	15C853	Horiz. Hold, Brightness, Contrast, Vert. Hold- Models 21KT540M, 21KT540B, 21KT541M, 21KT541B, 24TT510M, 24TT510B, 24TT511M, 24TT511B, 24KT551M, 24KT551B, 24KT550M, 24KT550B
	Knob	15A896	Horiz. Hold, brightness, contrast, vert. hold - Models 21KF521M, 21KF521B, 21KF520M, 21KF52B
	Knob	15C860	Fine Tuning - Models 21KT540M, 21KT540B, 21KF520M, 21KF520B, 24TT510M, 24TT510B, 24KT550M, 24KT550B
	Knob	15B858	Fine Tuning - Models 21KF521M, 21KT541M, 24TT511M, 24KT551M
	Knob	15B859	Fine Tuning - Models 21KF521B, 21KT541B, 24TT511B, 24KT551B
	Knob	15B916	On-Off-Volume - Models 21KT540M, 21KF520M, 24TT510M, 24KT550M
	Knob	15B917	On-Off-Volume - Models 21KT540B, 21KF520B, 24TT510B, 24KT550B
	Knob	15B918	On-Off-Volume - Models 21KF521M, 24TT511M, 24KT551M, 24KT541M
	Knob	15B919	On-Off-Volume - Models 21KF521B, 21KT541B, 24TT511B, 24KT551B
	Knob	15A920	VHF Channel Selector - Models 21KT541M, 24TT511M, 24KT551M
	Knob	15A921	VHF Channel Selector - Models 21KT541B, 24TT511B, 24KT551B
	Knob	15A928	VHF Channel Selector - Models 21KT540M, 24TT510M, 24KT550M
	Knob	15A929	VHF Channel Selector - Models 21KT540B, 24TT510B, 24KT550B
	Knob	15A930	VHF Channel Selector - Model 21KF520M
	Knob	15A931	VHF Channel Selector - Model 21KF520B
	Knob	15A922	VHF Channel Selector - Model 21KF521M
	Knob	15A923	VHF Channel Selector - Model 21KF521B
	Knob	15C860	UHF Tuning - Models 21KT541M, 21KT541B, 24TT511M, 24TT511B, 24KT551M, 24KT551B, 21KF521M, 21KF521B
	Knob	15C862	UHF-Calibrated - Models 21KT541M, 24TT511M, 24KT551M, 21KF521M
	Knob	15C863	UHF-Calibrated - Models 21KT541B, 24TT511B, 24KT551B, 21KF521B
	Mask	7D624	Models 21KT541M, 21KT540M
	Mask	7A627	Models 21KT541B, 21KT540B, 21KF520M, 21KF520B, 21KF521M, 21KF521B.
	Mask	7D625	Models 24TT510M, 24TT511M, 24KT551M, 24KT550M
	Mask	7D628	Models 24TT510B, 24TT511B, 24KT551B, 24KT550B
	Safety Glass	22-502	Models 21KT541M, 21KT541B, 21KT540M, 21KT540B, 21KF520M, 21KF520B, 21KF521M, 21KF521B
	Safety Glass	22-503	Models 24TT510M, 24TT510B, 24TT511M, 24TT511B, 24KT551M, 24KT551B, 24KT550M, 24KT550B

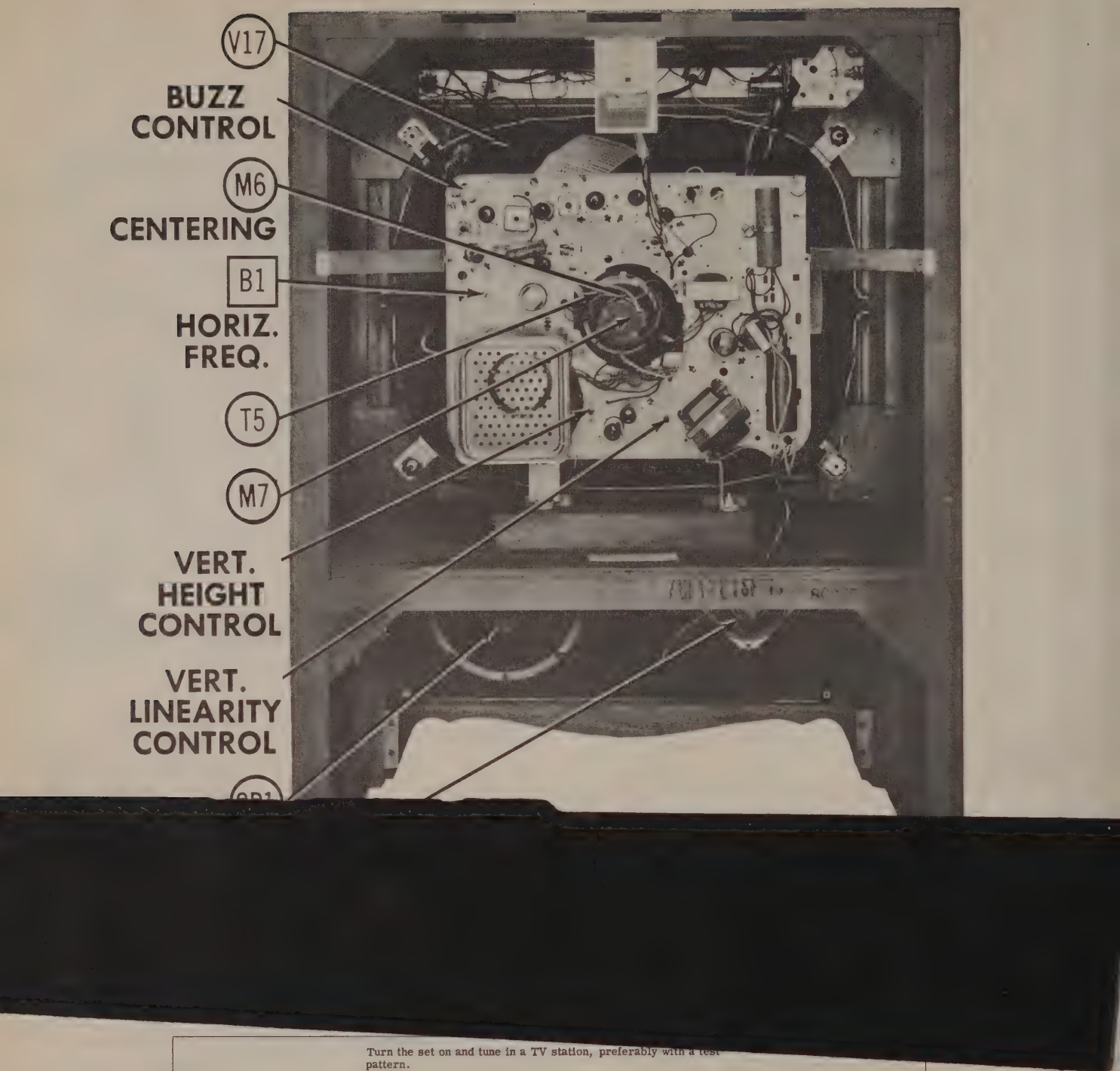
TUNER & CONTROL ASSEMBLY



RF TUNER-TOP VIEW



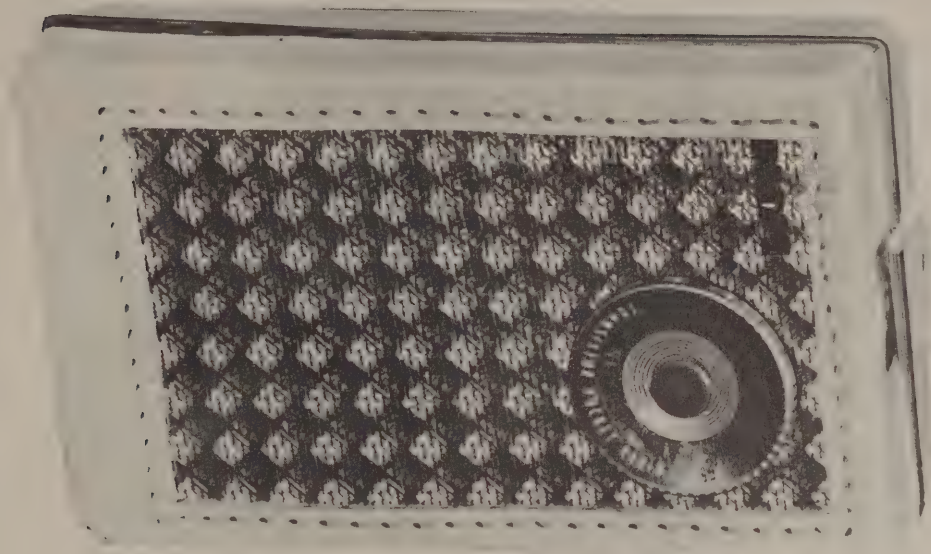
RF TUNER-BOTTOM VIEW



Turn the set on and tune in a TV station, preferably with a test pattern.

If the horizontal hold controls fail to maintain sync, set it in the middle of its range and adjust the horizontal frequency slug (B1) until the picture is in sync. Check other channels and if necessary, readjust B1 slightly for best sync on all channels.

MITCHELL MODELS
1101, 1102, 1103



MITCHELL MODELS
1101, 1102, 1103

TRADE NAME Mitchell Models 1101, 1102, 1103
MANUFACTURER Mitchell Mfg. Co., 2525 Clybourn Ave., Chicago 14, Ill.
TYPE SET Battery Operated Portable Transistorized AM Superheterodyne Receiver

POWER SUPPLY 22.5 Volts Battery RATING 4MA @ 22.5 Volts DC
TUNING RANGE—BROADCAST 535-1630KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	262KC (400~ Mod.)	Tuning gang fully open	Across ear-phone jack	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	535KC	Tuning gang fully closed	"	A4	"
3.		"	1630KC	Tuning gang fully open	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver Adjust for maximum output. Repeat steps 2 and 3.
4.		"	1500KC	Tune for max. signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. With tuning gang fully open, freq. range should extend to 1630KC. If not, repeat steps 3 and 4.

FOR THOSE PERSONS DESIRING MORE SERVICE INFORMATION ON SERVICING TECHNIQUES OF TRANSISTORIZED RECEIVERS, THE ARTICLE, "SERVICING THE TRANSISTOR RADIO" IN THE MARCH, 1955 ISSUE OF THE PF REPORTER, IS RECOMMENDED.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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G280

PARTS LIST AND DESCRIPTIONS

MITCHELL MODEL 1101

TRANSISTORS

ITEM No.	USE	REPLACEMENT DATA: MITCHELL - PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
X1	Converter			When replacing X2, C10 must be replaced with unit supplied. When replacing X3, C13 must be replaced with unit supplied.
X2	IF Amplifier			
X3	IF Amplifier			
X4	Output			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: MITCHELL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	5	25		XPP25V5	EC5-25	TAP50-5	ML-5-25		
C2	40	3		XPP3V40	EC40-3		ML-40-3		TE-1095
C3	2	3					ML-2-3		
C4	40	3		XPP3V40	EC40-3		ML-40-3		TE-1095

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MITCHELL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	20000			BPD-02	DD-203	K085	817-02		5HK-S2	
C6	268									
C7	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C8	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C9	50000									
C10										Note 1
C11	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C12	50000									
C13										Note 1
C14	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C15	20000			BPD-02	DD-203	K085	817-02		5HK-S1	
C16	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	

Note 1. Value of capacitor may vary, replace with original value. If transistor is replaced, replace capacitor with one supplied with transistor.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MITCHELL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	1000Ω	½						Volume

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MITCHELL PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	470KΩ	1/3		BTR-470K	
R3	10KΩ	1/3		BTR-10K	
R4	2200Ω	1/3		BTR-2200	
R5	100KΩ	1/3		BTR-100K	
R6	560Ω	1/3		BTR-560	
R7	2200Ω	1/3		BTR-2200	
R8	560Ω	1/3		BTR-560	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MITCHELL PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R9	2700Ω	1/3		BTR-2700	
R10	2200Ω	1/3		BTR-2200	
R11	560Ω	1/3		BTR-560	
R12	2700Ω	1/3		BTR-2700	
R13	3900Ω	1/3		BTR-3900	
R14	33KΩ	1/3		BTR-33K	
R15	1000Ω	1/3		BTR-1000	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: MITCHELL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	9.8KΩ	15Ω	100-629		TM-110A				

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: MITCHELL PART No.	REPLACEMENT DATA: QUAM PART No.	REPLACEMENT DATA: RCA TYPE No.	NOTES
SP1	2 3/4"	PM	15Ω	100-766		222S1	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: MITCHELL PART No.	REPLACEMENT DATA: MEISSNER PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: MILLER PART No.	NOTES
L1	Ant. Coil	5.3Ω						Tapped ② .2Ω
L2	Osc. Coil	1.3Ω	11Ω *					* Tapped ② .2Ω
L3	1st IF Trans.	8.5Ω	.85Ω					
L4	2nd IF Trans.	9Ω	1Ω					
L5	3rd IF Trans.	8.5Ω	1Ω					

BATTERIES

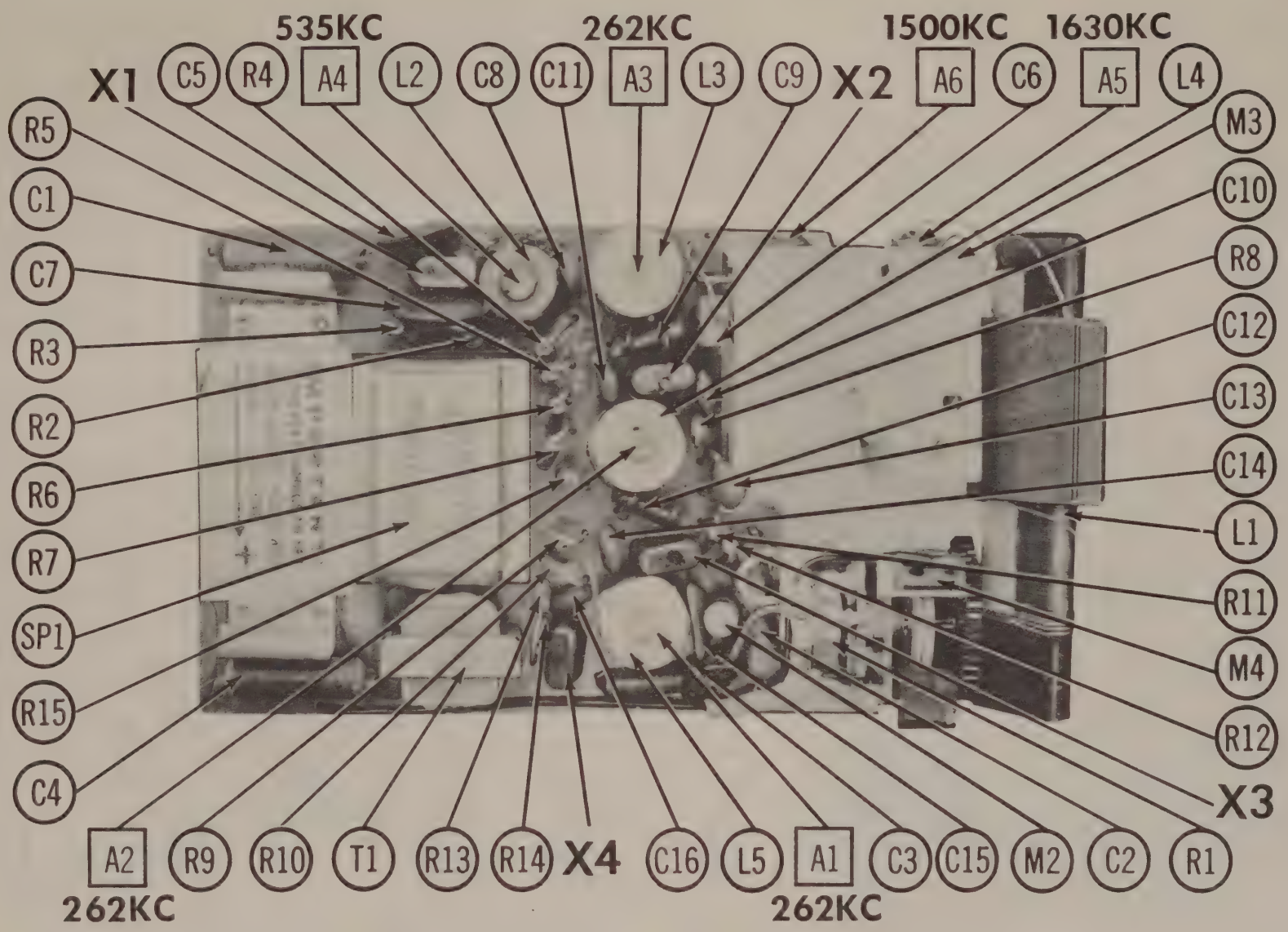
ITEM No.	VOLTAGE	MITCHELL PART No.	REPLACEMENT DATA: EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
M1	22.5V			412			U15 or X15		

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: MITCHELL PART No.	REPLACEMENT DATA: SYLVANIA PART No.	NOTES
M2	DR117		1N34A	Audio Det. (Pigtail)

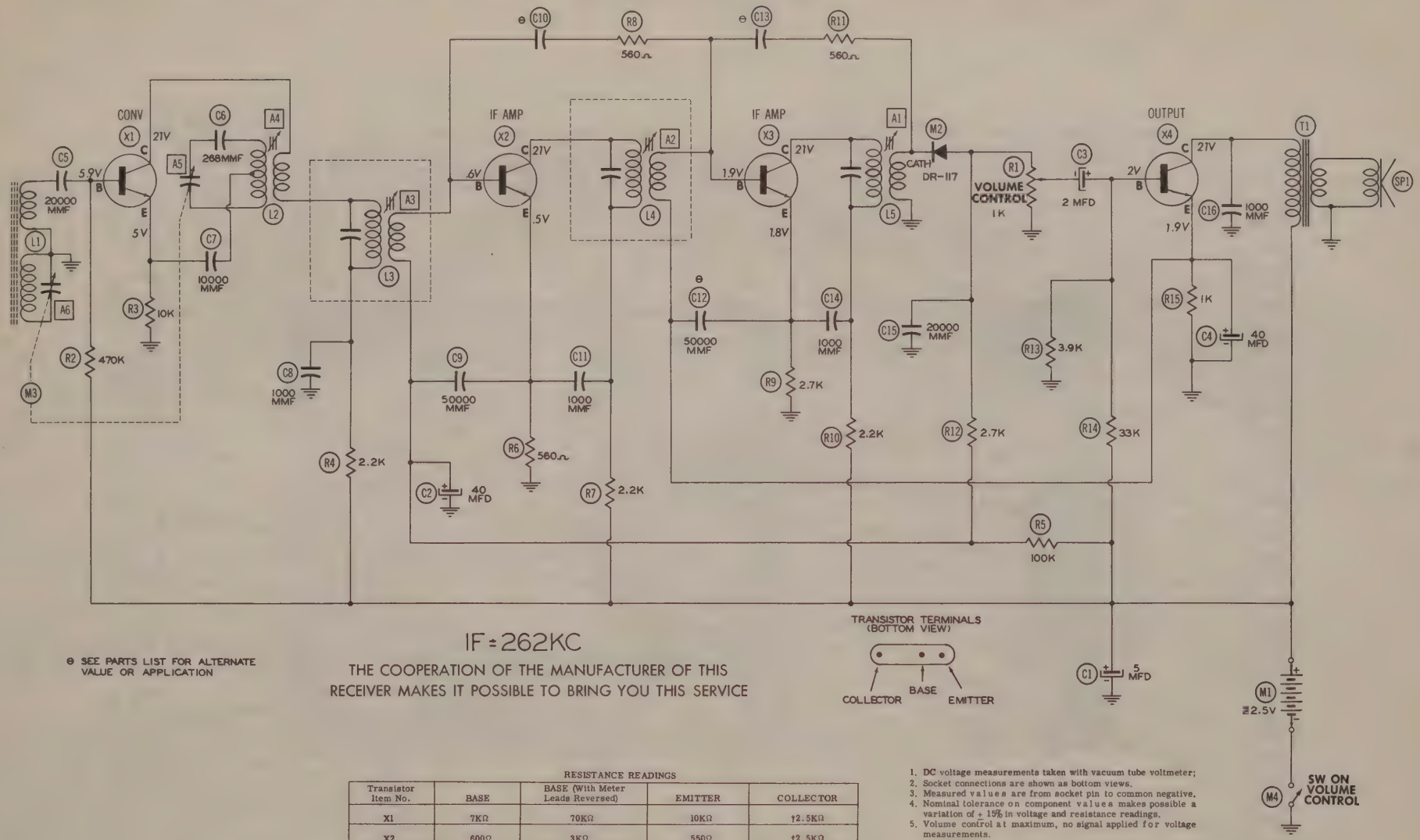
MISCELLANEOUS

ITEM No.	PART NAME	MITCHELL PART No.	NOTES
M3	Tuning Cap.	300-433	2 Gang (9-135MMF, 8-110MMF)
M4	Switch		On-Off (Switch consists of two contacts actuated by volume control knob).



CHASSIS TOP VIEW

MITCHELL
MODEL 1101



θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

IF = 262KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Transistor Item No.	BASE	BASE (With Meter Leads Reversed)	EMITTER	COLLECTOR
X1	7KΩ	70KΩ	10KΩ	†2.5KΩ
X2	600Ω	3KΩ	550Ω	†2.5KΩ
X3	750Ω	725Ω	2.7KΩ	†2.5KΩ
X4	850Ω	3.5KΩ	750Ω	†850Ω

CAUTION: DO NOT USE OHMMETER HAVING INTERNAL BATTERY LARGER THAN 3 VOLTS OR TRANSISTORS MAY BE DAMAGED.

† MEASURED FROM BATTERY B+

1. DC voltage measurements taken with vacuum tube voltmeter;
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

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MOTOROLA MODELS
66X1, 66X2 (Ch. HS-478)

MOTOROLA MODELS
66X1, 66X2 (Ch. HS-478)

TRADE NAME	Motorola Models 66X1, 66X2 (Ch. HS-478)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Six)	Types 12BA6 RF Amplifier, 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 35C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC RATING .26 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	530KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	455KC (400~ mod)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop (radiated).	1400KC	Tune to 1400KC signal.	"	A6, A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

MOTOROLA
MODEL 66X1 (Ch. HS-478)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT	
V1	RF Amplifier	12BA6	12BA6	
V2	Converter	12BE6	12BE6	
V3	IF Amplifier	12BA6	12BA6	
V4	Det. -AVC-AF Amplifier	12AV6	12AV6	
V5	Output	35C5	35C5	
V6	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	23B634167	PRS150V4030-20	BBRT44215	TCT3116	TDL-404020-150	FMT-315	TVA-3451
B	30	150							
C	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	100		21R400537	BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C3	.05	200	8R121005	BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C4	100		21R400537	BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C5	100		21R400537	BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C6	.006	400	8R121001	SI6000		CUB6D6	GP3-333-602	PT626	6TM-D6	
C7	.006	400	8R121001	SI6000		CUB6D6	GP3-333-602	PT626	6TM-D6	
C8	330		21R410118	BPD-00033	DD-331	G056	811-331	UC-5333	5GA-T33	
C9	.001	600	8R122103	SI1000	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C10	.01	200	8R121868	BPD-01	DD-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C11	10000		8R121946	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C12	.047	400	8K490232	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C13	.1	600	8R121869	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	18K634190	F1-51			UF16L	Tone (Panel)
B	1Meg	½		R2-59			UR16-T35+	Volume, Tapped at 300KΩ (Rear)
C	Switch			KB-1			US-26	Attach to R1B

+ Universal Replacement (Mallory Exact Duplicate Part No. UE1689S).

RESISTORS

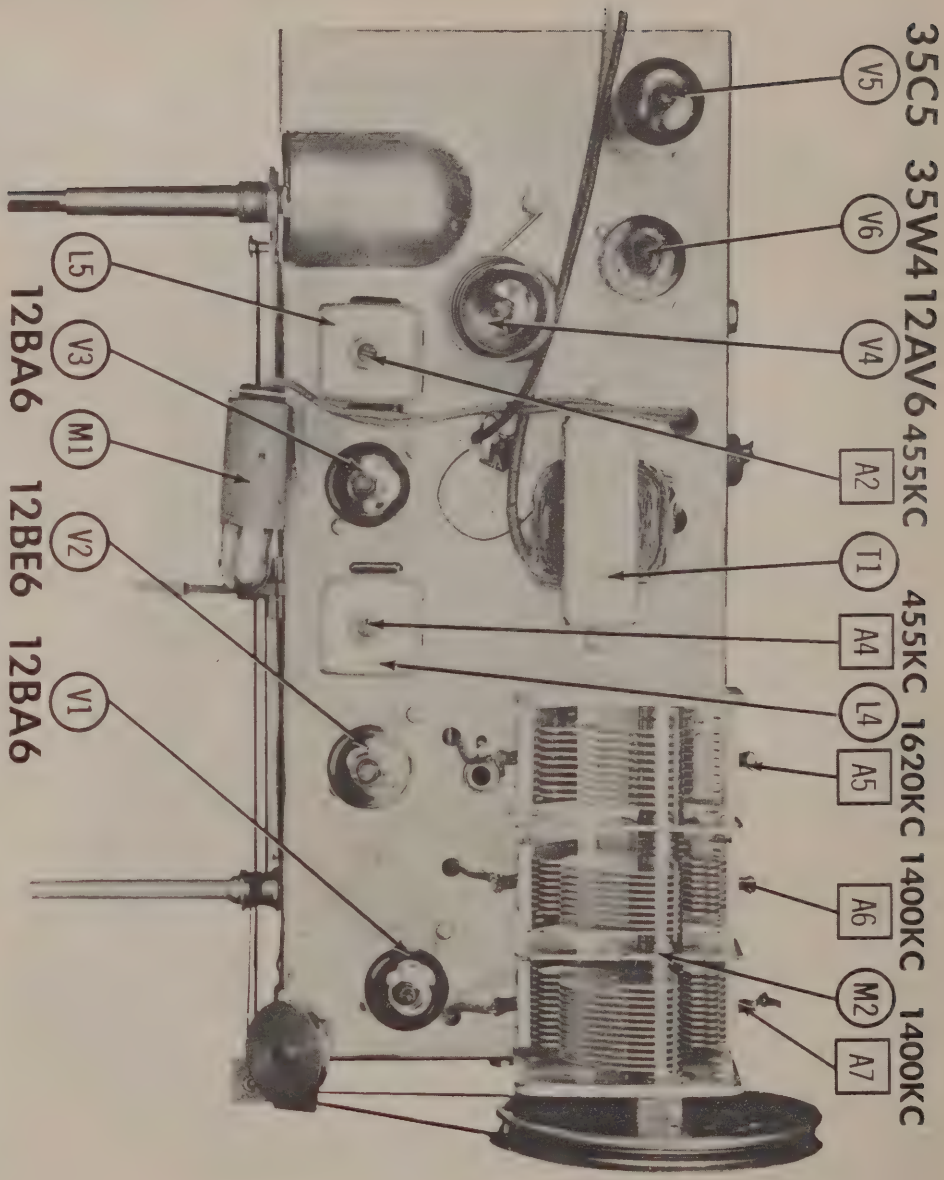
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R2	470KΩ	½	6R6032	BTS-470K	
R3	68Ω	½	6R2039	BTS-68	
R4	470KΩ	½	6R6032	BTS-470K	
R5	22KΩ	½	6R6028	BTS-22K	
R6	2.2Meg	½	6R3927	BTS-2.2Meg	
R7	82Ω	½	6R2035	BTS-82	
R8	33KΩ	½	6R6012	BTS-33K	
R9	100KΩ	½	6R6075	BTS-100K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R10	39KΩ	½	6R6487	BTS-39K	
R11	10Meg	½	6R2109	BTS-10Meg	
R12	470KΩ	½	6R6032	BTS-470K	
R13	470KΩ	½	6R6032	BTS-470K	
R14	150Ω	½	6R6373	BTS-150	
R15	390Ω	1	6R5598	BTA-390	
R16	390Ω	1	6R5598	BTA-390	
R17	15Ω	½	6R2034	BTS-15	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3.75KΩ	3-4Ω	25C634160-A	Z1001	A-2900	A3877	22S46	S-1X	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	50C634191-C	4A07 ①	223S1 ①	① Trim Corners To Match Original
SP2	4"	PM	3-4Ω	50K634192-C	4A07 ①	223S1 ①	

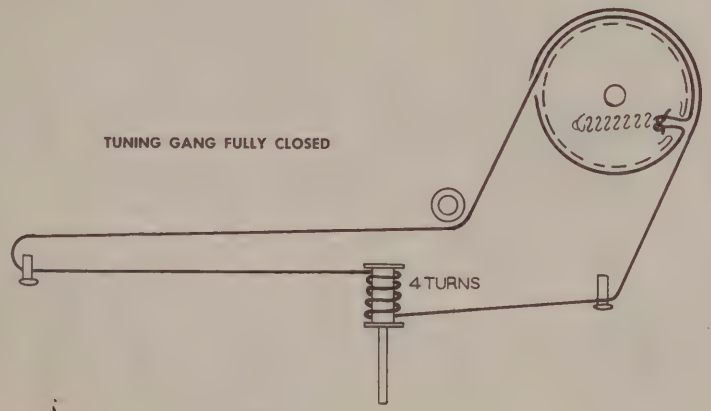
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.6Ω		1V63468				Includes cabinet back Note 1.
L2	RF Coil	2.6Ω	9Ω	24B634119	14-1076			
L3	Osc. Coil	.9	10.3Ω	24B634118			69-OSC	
L4	Input IF	16Ω	16Ω	24C632774	16-6758	BC-352	12-C1	
L5	Output IF	15Ω	15Ω	24K632775	16-6770	BC-355	12-C6	

Note 1. Part #1V634338 used in Model 66X1.

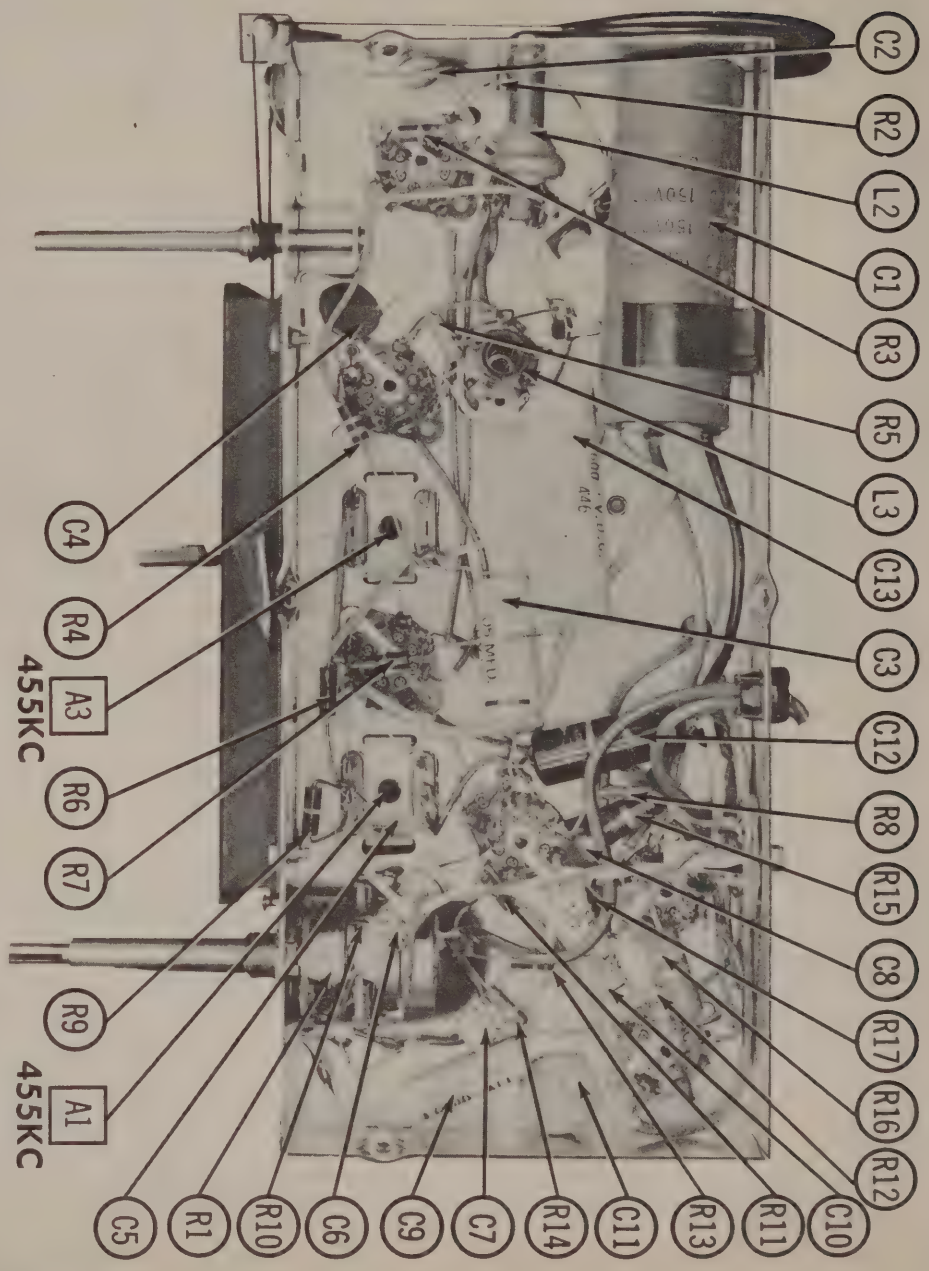
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Dial Light	65X11854	#47
M2	Tuning Cap.	19B634159	3 gang (19-385MMF, 19-285MMF, 25-150MMF).
	Cabinet	1V634338	Model 66X1
	Cabinet	1V634368	Model 66X2
	Knob	36K634197	Tone
	Knob	36K634194	On-Off-Volume & Tuning
	Dial Scale	61C634071	

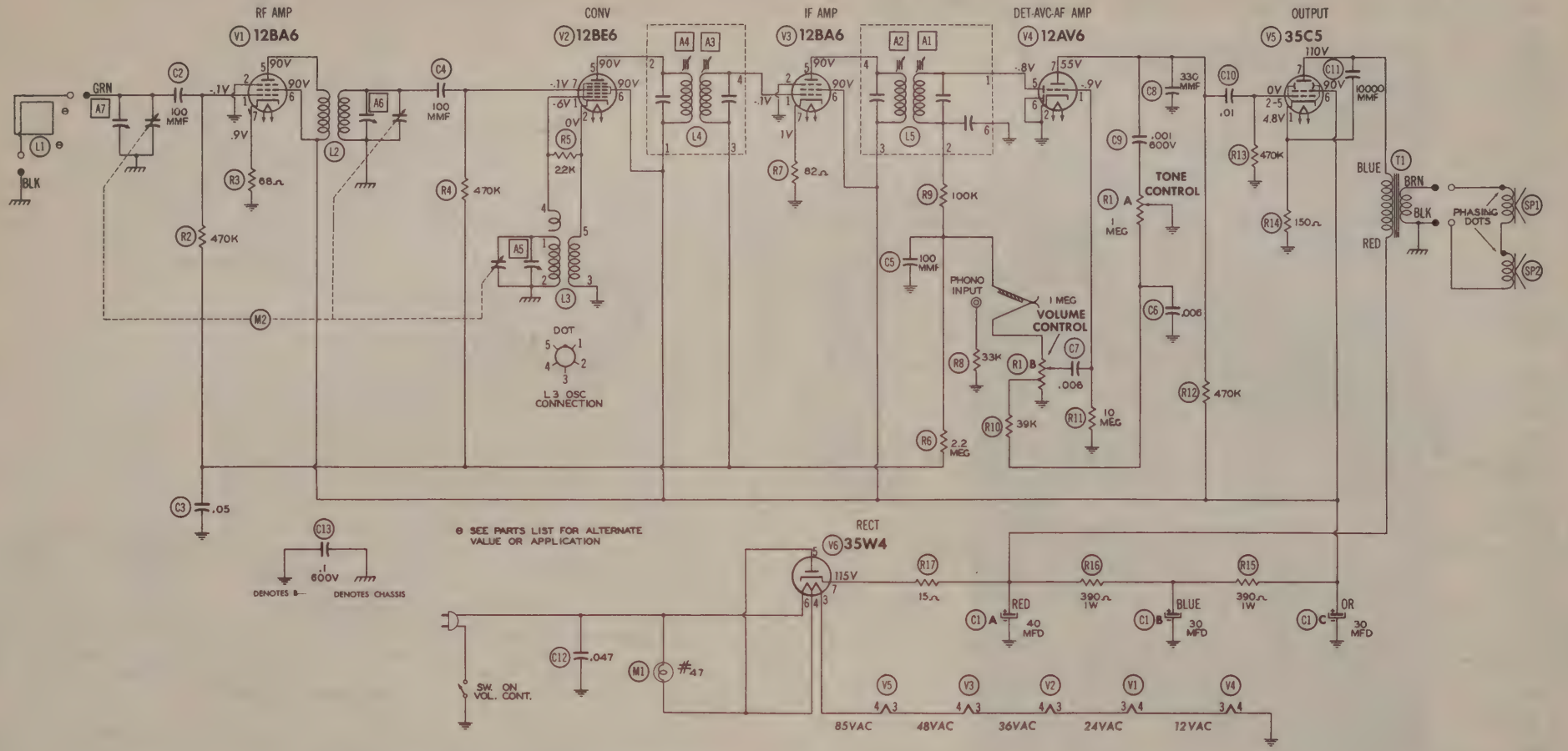


DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



MOTOROLA MODEL 66X1 (Ch. HS-478)



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BA6	3.7Meg	0Ω	24Ω	12Ω	↑ 800Ω	↑ 800Ω	68Ω
V 2	12BE6	22KΩ	1Ω	24Ω	36Ω	↑ 800Ω	↑ 800Ω	3.7Meg
V 3	12BA6	3.2Meg	0Ω	36Ω	48Ω	↑ 800Ω	↑ 800Ω	82Ω
V 4	12AV6	10Meg	0Ω	12Ω	0Ω	1Meg	0Ω	↑ 470KΩ
V 5	35C5	150Ω	470KΩ	48Ω	83Ω	470KΩ	↑ 800Ω	↑ 150Ω
V 6	35W4	TP	TP	83Ω	120Ω	115Ω	115Ω	50KΩ

↑ - MEASURED FROM PIN 7 OF V6.
TP - TIE POINT.

IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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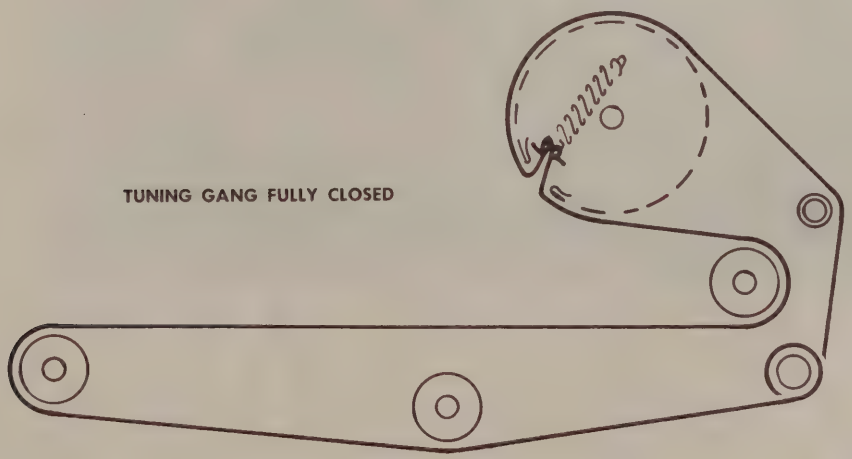
OLYMPIC
MODELS 576, 577

TRADE NAME	Olympic Models 576, 577	
MANUFACTURER	Olympic Radio & Tel. Corp., 34-01 38th. Ave., Long Island City 1, N.Y.	
TYPE SET	AC Operated FM-AM Superheterodyne Receiver with 3 Speed Automatic Record Changer	
TUBES	Twelve	
POWER SUPPLY	105-120 Volts AC-60 Cycles	RATING .74 Amp. @ 117Volts AC
TUNING RANGE-BROADCAST	535KC-1700KC	FREQ. MOD. 88MC-108MC

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT, PART #RX4083 - SEE SIMILAR V-M MODEL 954B-PHOTOFACT SET #302 - FOLDER 12.

OLYMPIC
MODELS 576, 577

TUNING GANG FULLY CLOSED



DIAL CORD STRINGING

PROPERTY OF
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DENVER, COLORADO

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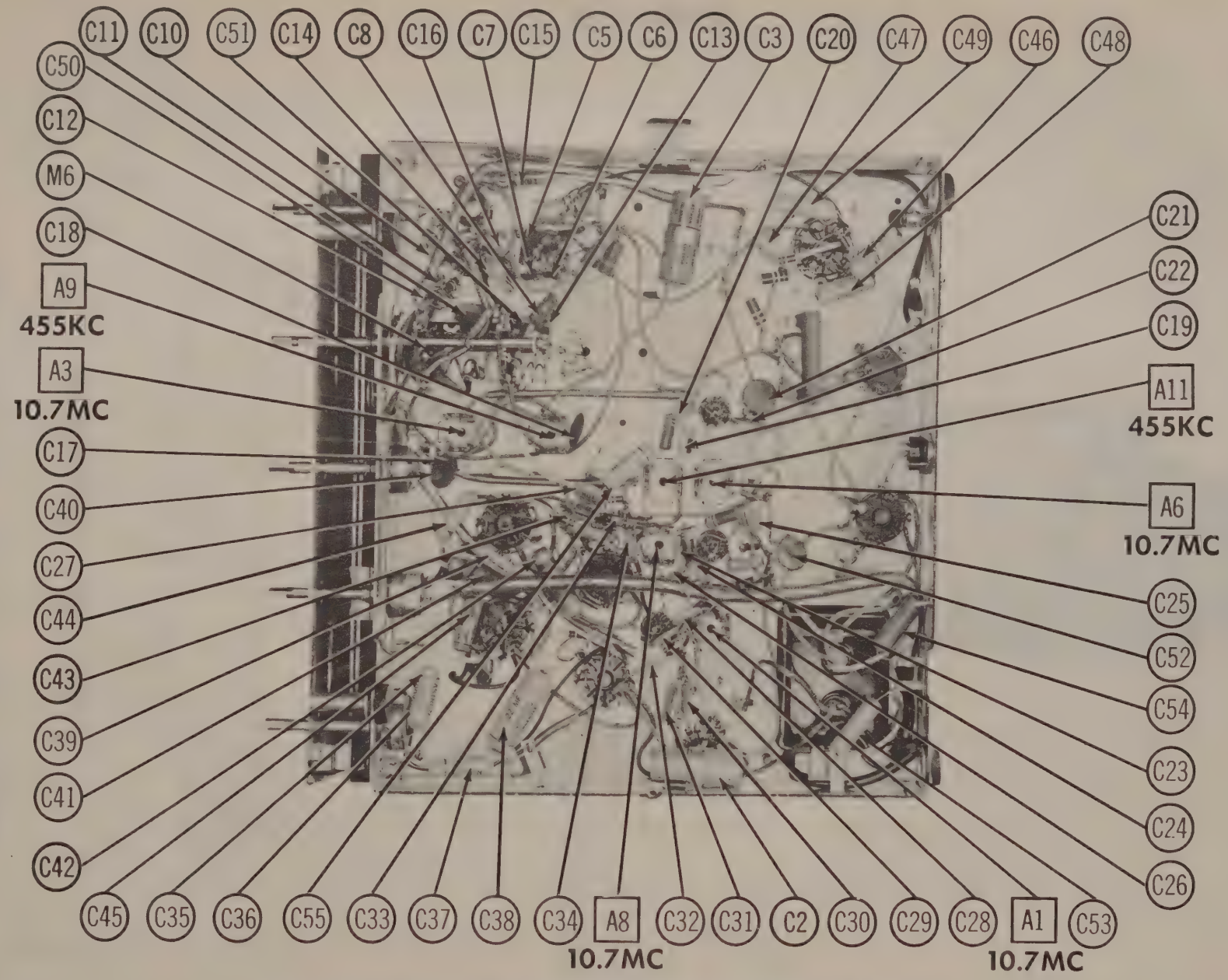
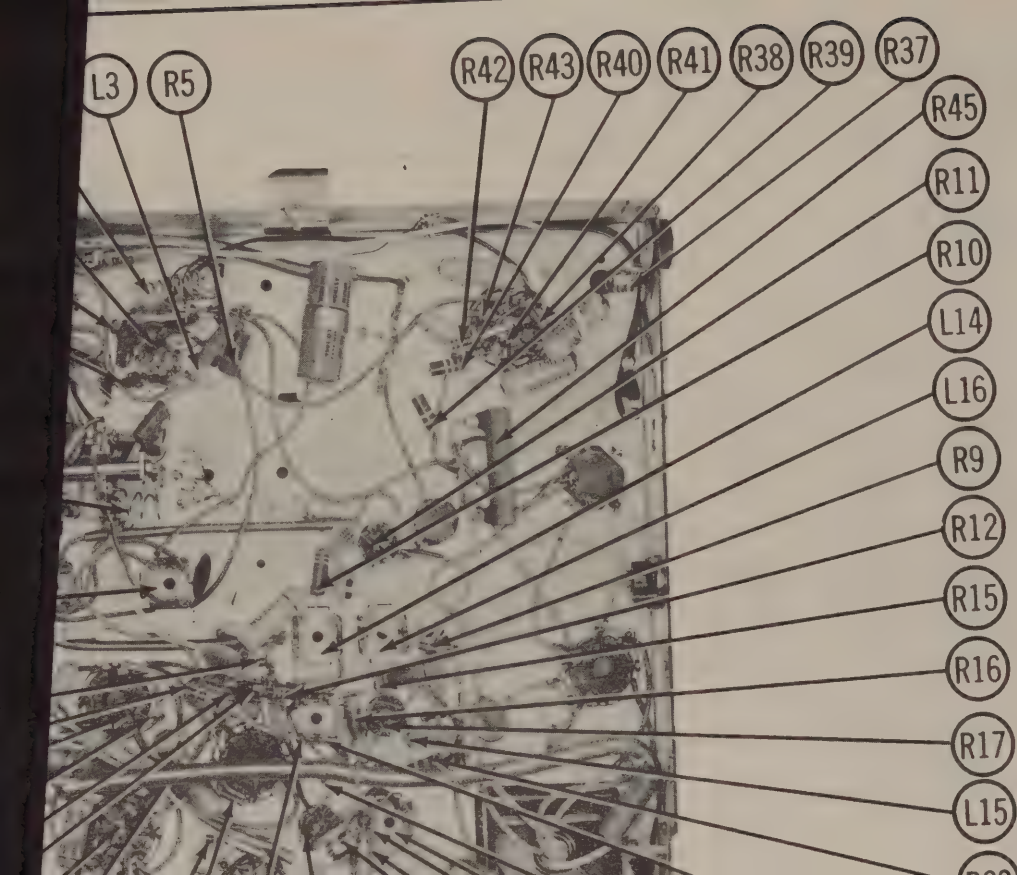


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION


L3
R5
R42
R43
R40
R41
R38
R39
R37
R45
R11
R10
L14
L16
R9
R12
R15
R16
R17
L15

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND SCOPE

30% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
10.7MC (450KC Swp)	FM	Tuning gang fully open	Vert. Amp. to point (A). Low side to chassis.	A1	Disconnect stabilizing capacitor (C2). Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
"	"	"	Vert. Amp. to point (B). Low side to chassis.	A2	Temporarily connect stabilizing capacitor (C2). Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2.
"	"	"	Vert. Amp. to point (A). Low side to chassis.	A3, A4, A5, A6, A7, A8	Disconnect stabilizing capacitor (C2). Adjust for curve of maximum amplitude and symmetry similar to Fig. 1. Reconnect stabilizing capacitor (C2). Proceed with step 5.

FM-AM-RF ALIGNMENT

oils) are preset at factory and realignment is not necessary unless coils have been

.

SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
88MC	FM	88MC	Across voice coil.	L8	Adjust for maximum deflection by expanding or compressing coil turns.
108MC	"	108MC	"	A13	Adjust for maximum deflection. Repeat steps 5 & 6 until tuning range is 88 to 108MC.
98MC	"	Tune to 98MC signal.	"	L1, L4	Adjust for maximum deflection by expanding or compressing coil turns.
1500KC	AM	1500KC	"	A14, A15	Adjust for maximum deflection.
			"		Check for tracking.

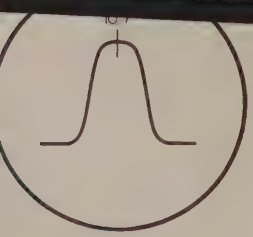


FIG. 1

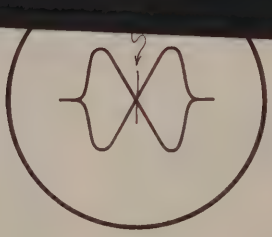


FIG. 2

NOTES
Note 2

SPRAGUE PART No.
TL-3790
VA-1702
VA-1702
VA-1501 } *
VA-1501

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C41	.002	600	CO-H-6202	BPD-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C42	.01	600	CO-H-6103	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C43	.047	400	CO-H-4473	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C44	.002	600	CO-H-6202	SI2000	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C45	.002	600	CO-H-6202	SI2000	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C46	.047	400	CO-H-4473	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C47	.0082	600	CO-H-6822							
C48	.047	400	CO-H-4473	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C49	.02	400	CO-H-4203	BPD-02	DD-203	CUB4S2	817-02	PT412	4TM-S2	
C50	100	500	RCM20A101M	SI100	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C51	220	500	RCM20A221M	SI220	D6-221	5W5T22	GP2K-221	MC240	1FM-322	
C52	10000		CCD103-X	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C53	.01	600	CO-B-6103	BPD-01	DD-103	CUB6S1	811-01	PT611	6TM-S1	
C54	.01	600	CO-B-6103	BPD-01	DD-103	CUB6S1	811-01	PT611	6TM-S1	
C55	.02	400		BPD-02	DD-203	CUB4S2	817-02	PT412	4TM-S2	Note 2

Note 2. Not used in some versions.
♦ Items C36A, C36B, C36C, C36D, R30A and R30B are combined in one unit.
Part number includes volume control.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA OLYMPIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	PT4061 ♦	C1-70		Q18-137XX	UDT-289	Volume, tapped @ 300KΩ & 600KΩ
B	Shaft		Not Req.	AK-16 *		Not Req.	Not Req.	Attach to R1A
R2A	3Meg	½	PT568	AB-85	A47-3Meg-Z	Q13-140	U-57	Treble
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R2A
R3A	2Meg	½	PT567	AB-75	A47-2Meg-S	Q11-139	U-56	Bass
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R3A

♦ Part number includes volume control and capacitor-resistor unit, R30 and C36.
* Saw off shaft of original control and use with coupler.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA OLYMPIC PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R4	1Meg	½	REB105M	BTS-1Meg	
R5	15KΩ	2	RED153M	BTA-15K	
R6	220Ω	½	REB221M	BTS-220	
R7	10KΩ	1	REC103K	BTA-10K	
R8	22KΩ	½	REB223M	BTS-22K	
R9	1000Ω	½	REB102M	BTS-1000	
R10	33KΩ	1	REC333M	BTA-33K	
R11	68Ω	½	REB680K	BTS-68	
R12	47KΩ	½	REB473M	BTS-47K	
R13	470KΩ	½	REB474M	BTS-470K	
R14	2.2Meg	½	REB225M	BTS-2.2Meg	
R15	33KΩ	1	REC333M	BTA-33K	
R16	33KΩ	1	REC333M	BTA-33K	
R17	68Ω	½	REB680K	BTS-68	
R18	10KΩ	½	REB103K	BTS-10K	
R19	2.2Meg	½	REB225M	BTS-2.2Meg	
R20	68KΩ	1	REC683M	BTA-68K	
R21	33KΩ	½	REB333M	BTS-33K	
R22	47KΩ	½	REB473M	BTS-47K	
R23	220Ω	½	REB221M	BTS-220	
R24	22KΩ	½	REB223M	BTS-22K	
R25	10KΩ	½	REB103K	BTS-10K	
R26	10KΩ	½	REB103K	BTS-10K	
R27	10Meg	½	REB106M	BTS-10Meg	
R28	470KΩ	½	REB474M	BTS-470K	
R29	47KΩ	½	REB473M	BTS-47K	
R30A	100KΩ		♦PT4061	BTS-100K	
B	100KΩ			BTS-100K	
R31	10Meg	½	REB106M	BTS-10Meg	
R32	470KΩ	½	REB474M	BTS-470K	
R33	470KΩ	½	REB474M	BTS-470K	
R34	100KΩ	½	REB104M	BTS-100K	
R35	470KΩ	½	REB474M	BTS-470K	
R36	220Ω	2	RED221K	BTB-220	
R37	47KΩ	½	REB473M	BTS-47K	Note 1
R38	3.3Meg	½	REB335M	BTS-3.3Meg	
R39	330KΩ	1	REC334M	BTA-330K	
R40	68KΩ	1	REC683M	BTA-68K	
R41	3.3Meg	½	REB335M	BTS-3.3Meg	
R42	47KΩ	½	REB473M	BTS-47K	
R43	39KΩ	½	REB393M	BTS-39K	
R44	470KΩ	½	REB474M	BTS-470K	
R45	400Ω	10	RE3396	1 3/4A-400	

♦ Items R30A, R30B, C36A, C36B, C36C, C36D are combined in one unit. Part number includes volume control.
Note 1. Some versions use a 22KΩ, ½ watt resistor in this application (Mfgr. part #REB223M).

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @.74A	570VCT .102ADC	5VAC @ 2A	6.3VAC @3.4A	TR3666	P9209		PM8405	22R05	R-12B

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	8KΩ	3.3Ω	TR2156	Z1011	A-3027	A-3830	22S88	S-15X	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA OLYMPIC PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	12"	PM	6.8Ω	SK4081	12A4	412S7	
SP2	8"	PM	6.8Ω	SK4102	8A4	208S4	
SP3	3½"	PM	14Ω	SK4076	3A15T		

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA OLYMPIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Coil	0Ω		CL2178				Tapped
L2	Fil. Choke	1.8Ω		CK2445	19-1002		4606	2.2 Microhenries, IRC part #CLA
L3	RF Coil	2.8Ω		CK2446	19-1003		4608	4.7 Microhenries, IRC part #CL-1
L4	FM RF Coil	0Ω		CL2179				
L5	Fil. Choke	1.8Ω		CK2445	19-1002		4606	2.2 Microhenries, IRC part #CLA
L6	Cathode Choke	.22Ω		CK2447	19-1000		4602	.47 Microhenries, IRC part #CLA
L7	Parasitic Suppressor	0Ω		REB100M				2 turns #20 bare wire wound on 10Ω resistor
L8	FM Osc. Coil	0Ω		CL2179				
L9	AM Loop Ant.	.1Ω	1.2Ω	LP2176				
L10	AM Osc. Coil	.4Ω	5.5Ω	CL1466	14-1074	BC-397 *	5480-C *	
L11	1st. FM IF	.7Ω	.7Ω	TR2180	16-3487	FM-254	1463	
L12	1st. AM IF	13Ω	13Ω	TR1644	16-6758	BC-352	12-C1	
L13	2nd. FM IF	.7Ω	.7Ω	TR1643	16-3487	FM-254	1463	
L14	2nd. AM IF	8Ω	8Ω	TR1645	16-6758	BC-353	12-C2	
L15	Fil. Choke	1.8Ω		CK2445	19-1002		4606	2.2 Microhenries, IRC part #CLA
L16	3rd. FM IF	.7Ω	.7Ω	TR1643	16-3487	FM-254	1463	
L17	Ratio Detector	1.5Ω	.8ΩCT	TR1646	17-3488 ■	FM-255	1465	Tertiary winding -.4Ω

* Drill mounting hole.
■ Cut out chassis hole and drill mounting holes.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA OLYMPIC PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M1						

PHONO NEEDLE

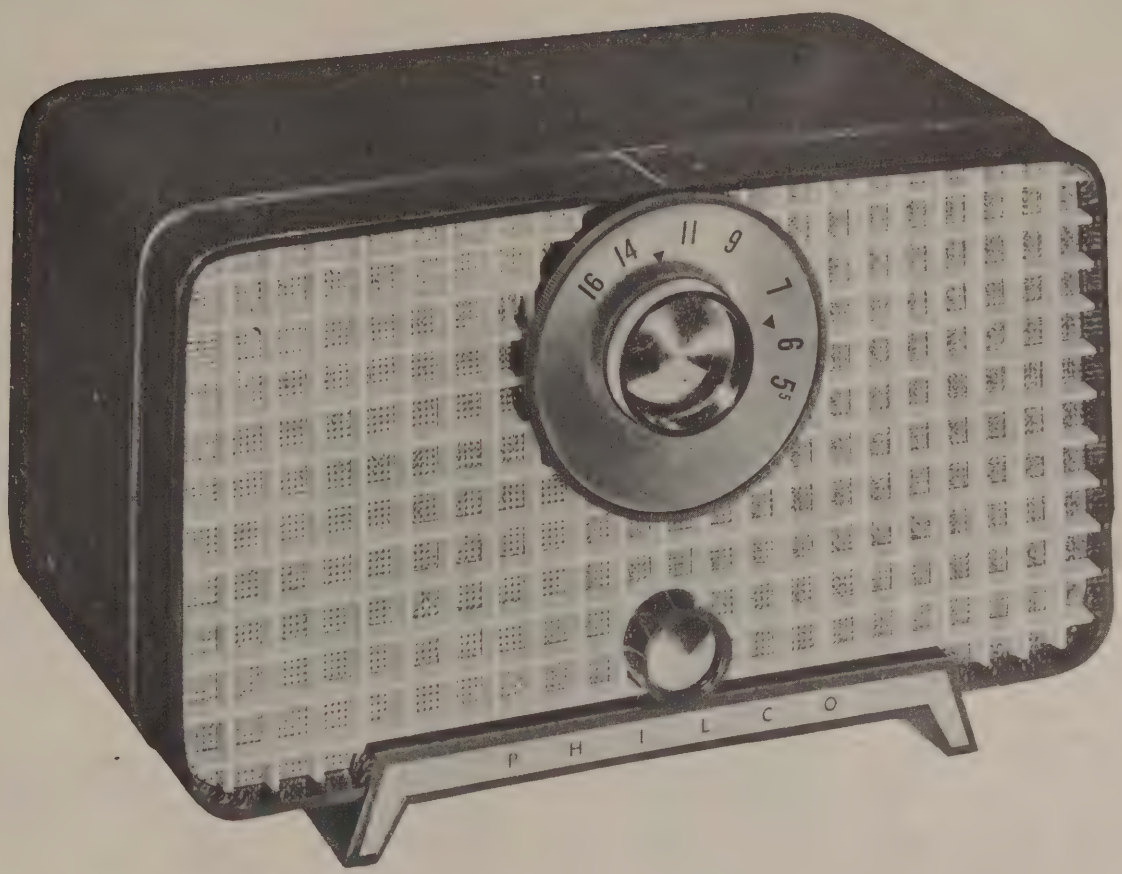
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA OLYMPIC PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M2		†G-13 or †♦G-13SD or ♦G-13D	†AC-410 or †♦AC-410D1 or ♦AC-410D	†W-68TPS or †♦W-68DS or ♦W-68TPD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M3	Dial Light	BU187	#47
M4	Dial Light	BU187	#47
M5	Tuning Cap.	CV-2165	4 Gang (AM Section: 29-525MMF, 22-195MMF)
M6	Switch	SW2159	FM-AM-Phono (Rotary-wafer type)

PHILCO MODELS D-592, D-593, D-595, D-598, D-727, D-728, D-730, D-736



PHILCO MODELS D-592, D-593, D-595, D-598, D-727, D-728, D-730, D-736

TRADE NAME	Philco Models D-592, D-593, D-595, D-598, D-727, D-728, D-730, D-736 (Code 124)
MANUFACTURER	Philco Corp. Tioga & "C" Streets, Philadelphia, Pa.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver (AC Operation for Clock Models)
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 35C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-DC (60 Cycle-AC for Clock Models) RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop (Radiated)	1620KC	1620KC *	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1500KC	Tune to 1500KC signal		A6	"

* Open tuning gang and insert .006 inch non-metallic shim between heel of rotor and top of stator plates. Close gang enough to hold shim in place. Carefully remove shim so that gang setting is not disturbed.

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DENVER, COLORADO

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PARTS LIST AND DESCRIPTIONS

PHILCO MODEL D-592 (Code 124)

PARTS LIST AND DESCRIPTIONS (Continued)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	Converter	12BE6	12BE6	
V2	IF Amplifier	12BA6	12BA6	
V3	Det. AVC-AF Amp.	12AV6	12AV6	
V4	Output	35C5	35C5	
V5	Rectifier	35W4	35W4	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: PHILCO PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	4"	PM	3-4Ω	36-1654 ① 36-1663-6 ② 36-1660 ③ 36-1655 ④	4A07	223S1	① Used in Models D592, D593, D595, D597, and D728. ② Used in Model D598, 2 used. ③ Used in Model D730. ④ Used in Model D736.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	VOLT.	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲ 70	150	30-2585-5	RE1025	C010			T-055	R2205 *
B	■ 15	150							
C	15	150							

* Unit must be ordered from manufacturer.

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: PHILCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Stick Ant.	.9Ω		76-9228-3				
L2	Osc. Coil	.4Ω	8.5Ω	32-4582-5				
L3	Input IF	15Ω	15Ω	32-4583-5	16-6780		13-PC1	
L4	Output IF	16Ω	16Ω	32-4583-6	16-6780		13-PC2	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.047	200	30-4650-41	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C3	9		30-1251-50							
C4	47		30-1230-4	SI-47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C5A	220		† 30-6006	† PA-512	† PC-158					
B	5000									
C	5000									
D	250									
E										
C6	10000		30-1238-2	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C7	.047	400	30-4650-45	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

† Items C5A, C5B, C5C, C5D, C5E, R5A, R5B, and R5C are combined in one unit. When replacing items separately, C4D and C4C should total 250 MFD.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500KΩ	½	33-5575-4					Volume & Switch - See Note 1
	250KΩ	½	33-5581					Tone & Radio-Phono Sw. See Note 2.

Note 1. Model D-598 will use volume control Part No. 33-5566-73 in this application. Models D-727, D-728, D-730 and D-736 will use volume control Part No. 33-5575-3 in this application.
Note 2. Used in Model D-598 only.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	22KΩ	½	66-3228340	BTS-22K	
R3	68Ω		66-0688340	BTS-68	
R4	2.2Meg		66-5228340	BTS-2.2Meg	
R5A	6.8Meg		†30-6006	BTS-6.8Meg	
B	470KΩ			BTS-470K	
C	470KΩ			BTS-470K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R6	150Ω	½	66-1158340	BTS-150	
R7	2200Ω		66-2228340	BTS-2200	
R8	3300Ω		66-2338340	BTS-3300	
R9	100Ω	2	33-1360-6	PW4-200	

† Items R5A, R5B, R5C, C5A, C5B, C5C, C5D, C5E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

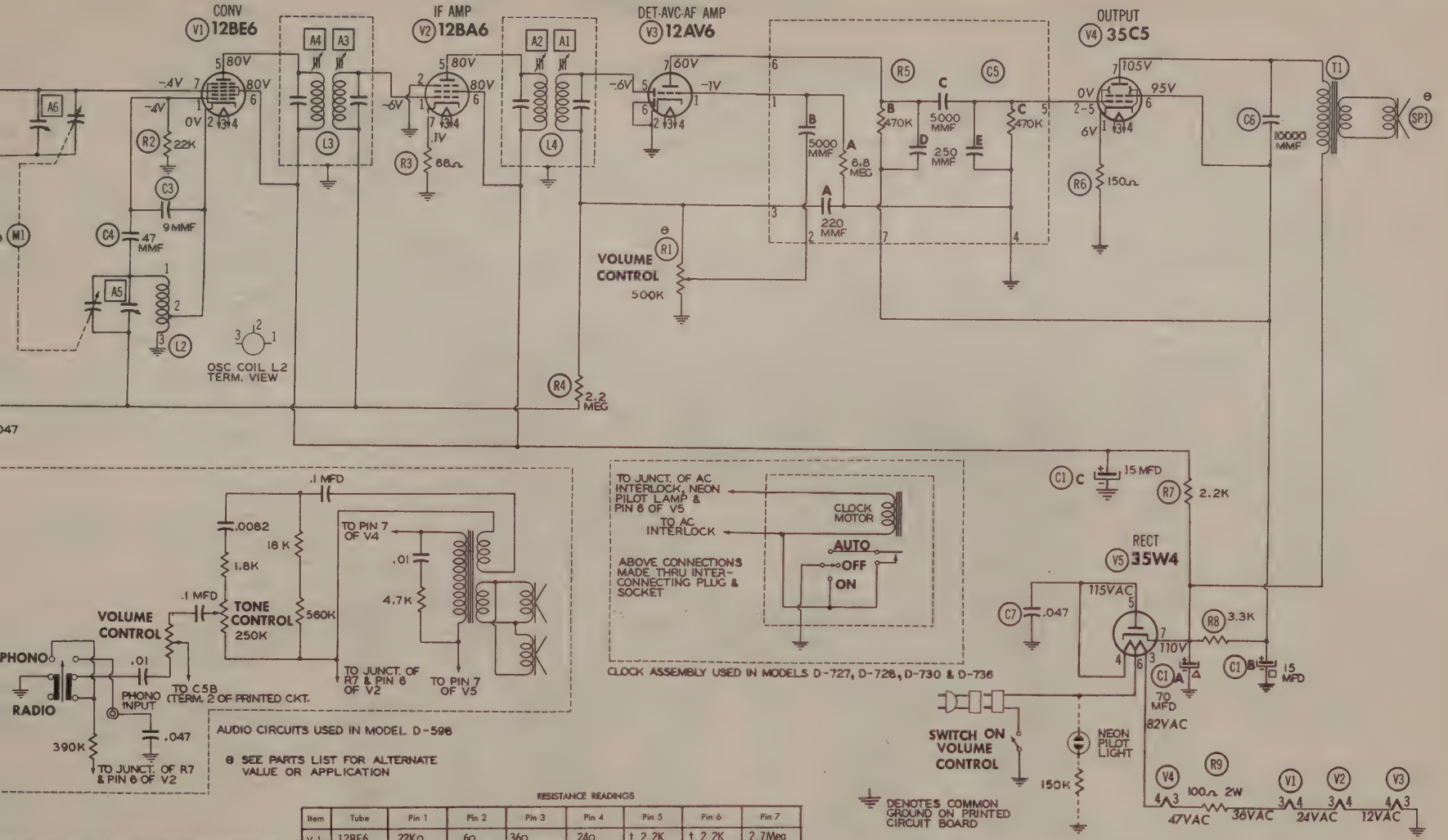
ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: PHILCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2.3KΩ	3-4Ω	32-8384-2	Z1101	A-3025	A-3332	26S58	S-12X	

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M1	Tuning Cap.	31-2780-2	2 Gang-All Models Except D-598
	Tuning Cap.	31-2780-5	2 Gang-Model D-598 only.
M2	Clock	41-2057-2	Model D-736
	Clock	41-2057-3	Model D-728; Used With Lustre Ivory Cabinets
	Clock	41-2048-7	Model D-730; Used with Lustre Ivory Cabinets
	Clock	41-2057-1	Model D-730; Used with Mayan Turquoise Cabinets
	Cabinet	11063-8	Model D-592
	Cabinet	11063-6	Caribbean Green-Model D-593
	Cabinet	11063-9	Cherry-Model D-593
	Cabinet	11063-7	Lustre Ivory-Model D-593
	Cabinet	11148-1	Model D-595
	Cabinet	11152	Model D-736
	Cabinet	11162	Model D-598
	Cabinet	11062-10	Model D-727
	Cabinet	11062-9	Bermuda Pink-Model D-728
	Cabinet	11062-7	Caribbean Green-Model D-728
	Cabinet	11062-8	Lustre Ivory-Model D-728
	Cabinet	11076-12	Bolero Red-Model D-730
	Cabinet	11076-11	Lustre Ivory-Model D-730
	Cabinet	11076-13	Mayan Turquoise-Model D-730
	Knob	54-6156-12	Tuning-Used in Model D-592 & with Cherry Cabinets of Model D-593
	Knob	54-6156-8	Tuning-Model D-593, Caribbean Green Cabinets
	Knob	54-6156-9	Tuning-Model D-593, Lustre Ivory Cabinets
	Knob	54-6224	Tuning & Volume-Model D-736
	Knob	54-6230-2	Tuning-Model D-598
	Knob	54-6156-13	Tuning-Model D-727
	Knob	54-6093-7	Tuning-Model D-728, Bermuda Pink Cabinets
	Knob	54-6147-17	Tuning-Model D-728, Caribbean Green Cabinets
	Knob	54-6147-18	Tuning-Model D-728, Lustre Ivory Cabinets
	Knob	54-6093-9	Tuning & Volume-Model D-730, Bolero Red Cabinets
	Knob	54-6093-8	Tuning & Volume-Model D-730 Lustre Ivory Cabinets
	Knob	54-6093-10	Tuning & Volume-Model D-730, Mayan Turquoise Cabinets
	Knob	54-6159-14	Volume-Used in Model D-592 & with Cherry Cabinets of Model D-593
	Knob	54-6159-11	Volume-Model D-593, Caribbean Green Cabinets
	Knob	54-6159-12	Volume-Model D-593, Lustre Ivory Cabinets
	Knob	54-4773-28	Volume & Tone-Model D-598
	Knob	54-4773-23	Volume-Model D-727
	Knob	54-6035-1	Volume-Model D-728, Bermuda Pink Cabinets
	Knob	54-4773-16	Volume-Model D-728, Caribbean Green Cabinets
	Knob	54-4773-17	Volume-Model D-728, Lustre Ivory Cabinets
	Knob	54-6096-3	Clock (2 Used)-Models D-736, D-727, D-728, D-730
	Knob	54-6240	Pointer-Model D-598
	Dial Scale	28-10231-4	Models D-592, D-593
	Dial Scale	54-6244	Model D-598
	Crystal	54-6196-1	Clock-Models D-736, D-730
	Crystal	54-5208	Clock-Models D-727, D-728

CHASSIS-TOP VIEW

MODEL D-592 (Code 124)
PHILCO



AUDIO CIRCUITS USED IN MODEL D-598

θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

TO JUNCT. OF AC INTERLOCK, NEON PILOT LAMP & PIN 6 OF V5
TO AC INTERLOCK
CLOCK MOTOR
AUTO
OFF
ON
ABOVE CONNECTIONS MADE THRU INTER-CONNECTING PLUG & SOCKET

CLOCK ASSEMBLY USED IN MODELS D-727, D-726, D-730 & D-736

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.6Ω	36Ω	24Ω	† 2.2K	† 2.2K	2.7Meg
V 2	12BA6	2.7Meg	0Ω	24Ω	12Ω	† 2.2KΩ	† 2.2KΩ	68Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	500KΩ	0Ω	† 473KΩ
V 4	35C5	150Ω	NC	136Ω	186Ω	470KΩ	† 3.3KΩ	† 240Ω
V 5	35W4	TP	TP	186Ω	230Ω	230Ω	220Ω	20KΩ

† - MEASURED FROM PIN 7 OF V5.
TP - TIE POINT
NC - NO CONNECTION

voltage measurements taken with vacuum tube voltmeter;
voltages measured at 1000 ohms per volt.
cket connections are shown as bottom views.
easured values are from socket pin to common negative.
he voltage maintained at 117 volts for voltage readings.
minal tolerance on component values makes possible a
riation of ± 15% in voltage and resistance readings.
lume control at maximum, no signal applied for voltage
easurements.

IF = 455KC

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TOFACT STANDARD NOTATION SCHEMATIC

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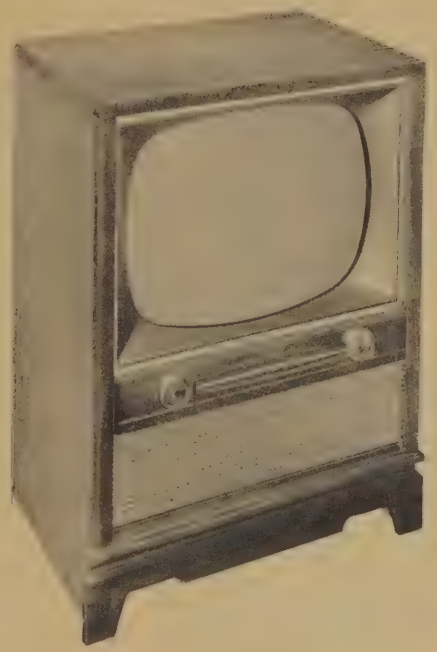

PHILCO MODEL 22D4152

TRADE NAME	Philco	MODELS	CHASSIS
		22D4034, 22D4034L, 22D4134, 22D4134L, 22D4140, 22D4140L, 22D4151, 22D4151L, 22D4152, 22D4152HM, 22D4152M, 22D4157, 22D4160XL, 22D4160X	TV-390
		22D4041, 22D4041L, 22D4144, 22D4144L, 22D4145, 22D4156, 22D4156L, 22D4159, 22D4160, 22D4160L, 22D4161, 22D4161L, 22D4165, 22D4324HM, 22D4324M, 22D4326, 22D4420, 22D4420L, 22D4422	TV-392
MANUFACTURER	Philco Corporation, Tioga & "C" Sts., Philadelphia, Pa.		
TYPE SET	Television Receiver		
TUBES	Eighteen		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.72 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) AM Radio 535-1620KC, AM IF 455KC		

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Schematic (TV) 2

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Tube Placement Chart (Top View) 5

Models 22D4420, L have AM Tuner, Audio Amplifier chassis with single tube output and Record Changer Model M-26 with Red Cartridge.

Model 22D4422 has AM Tuner, Audio Amplifier chassis with a push-pull output and Record Changer Model M-26 with Gray Cartridge.

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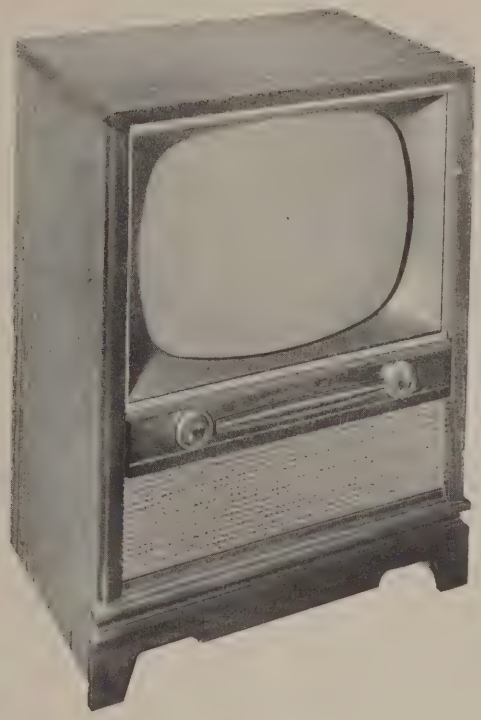

MODEL CHASSIS
22D4152 ..... TV-390

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.

2. Remove plastic snap-on control cover on secondary control knobs and remove 4 small push-on type knobs.

3. Remove 5 wood screws. Remove rear cover.

4. Disconnect picture tube socket, yoke plug, speaker plug and ground strap.

5. Remove 5 chassis bolts. Remove chassis.

6. Remove 4 speaker nuts. Remover speaker.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 3 wood screws holding metal molding at the top edge of the safety glass. Remove metal molding and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

To adjust the horizontal oscillator remove the rear cover and supply power to the set. Set the horizontal hold control at the center of its range and adjust the horizontal oscillator control (R8) until the picture synchronizes horizontally. R8 is located on top of the chassis.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L37) located on top of the chassis.

FUSES

One fuse is used for LV power supply. protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

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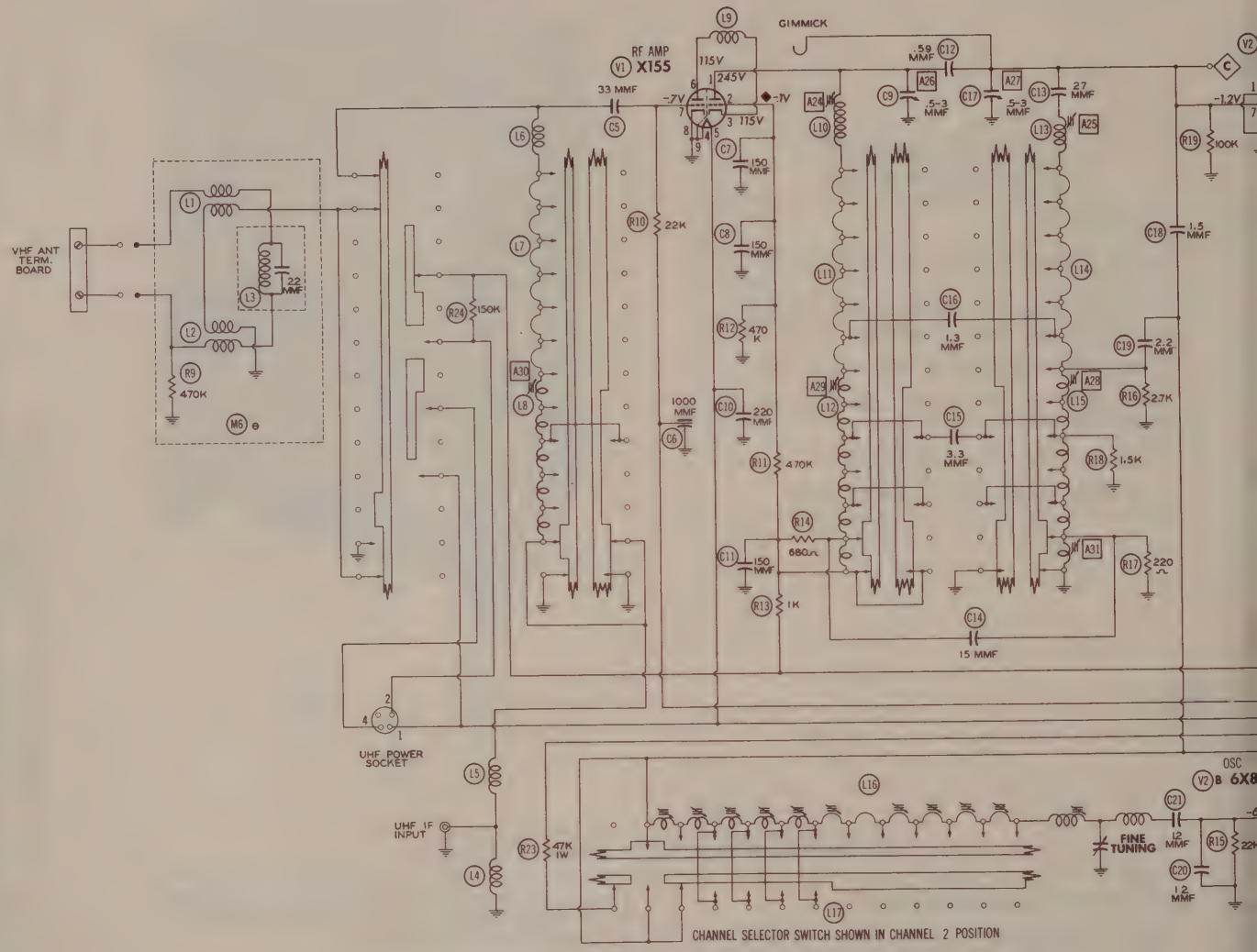

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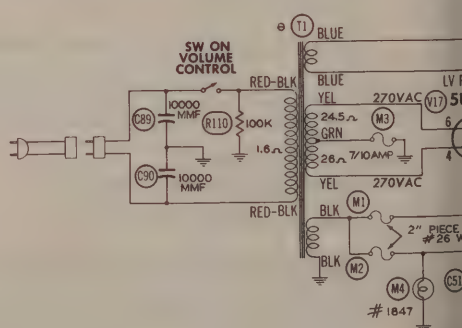

◆ MEASURED FROM PIN 3 OF V1.

MEASURED FROM 135V LINE.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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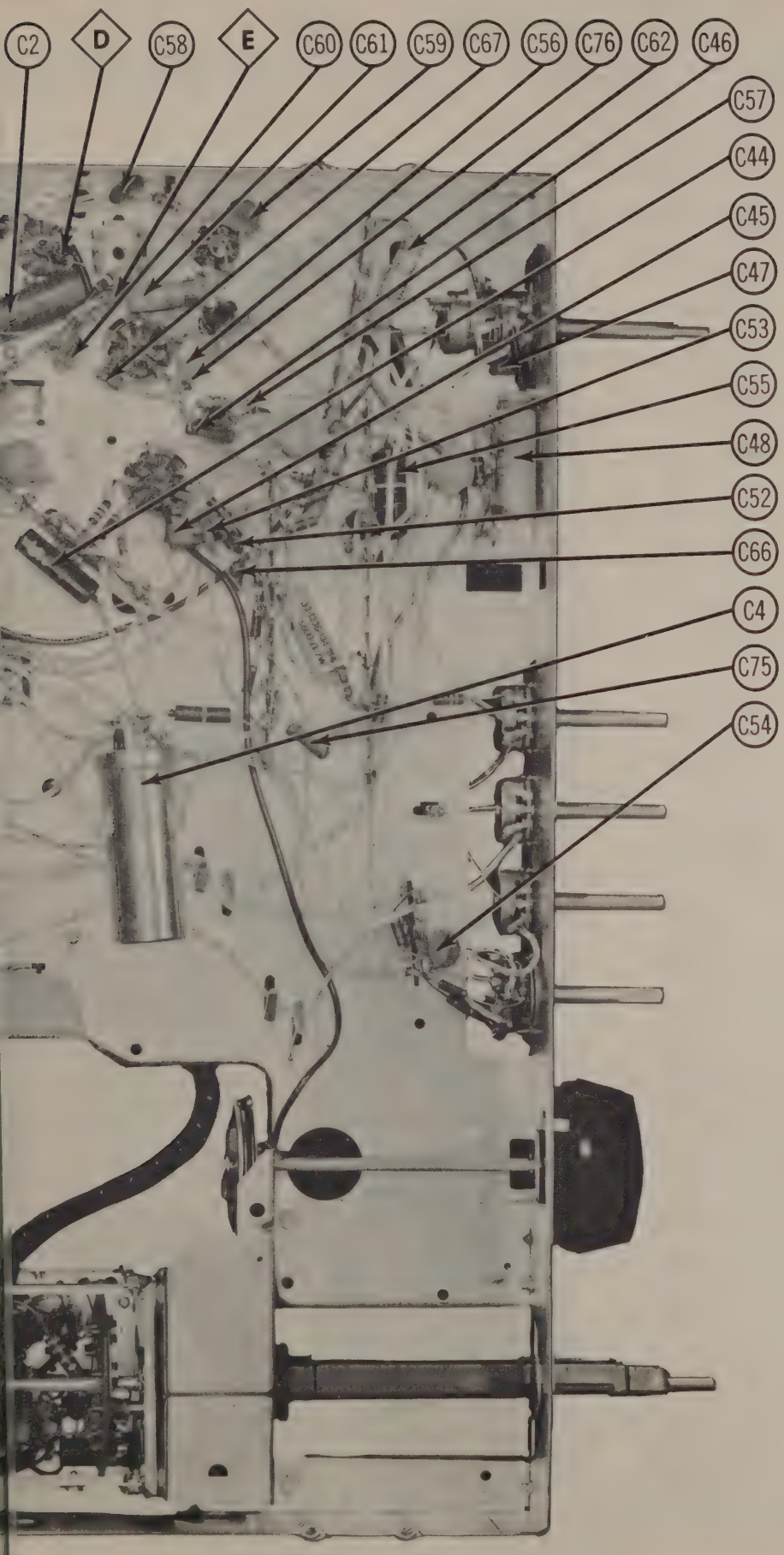
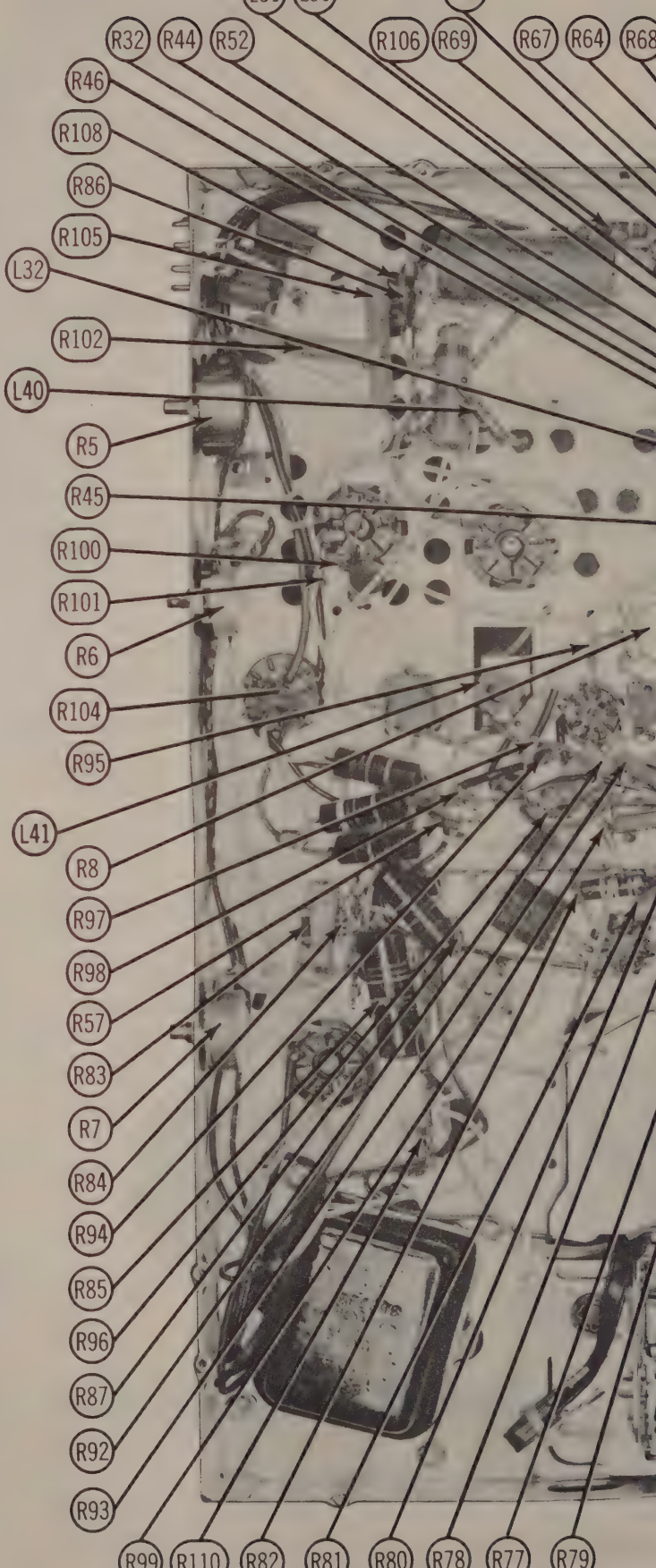
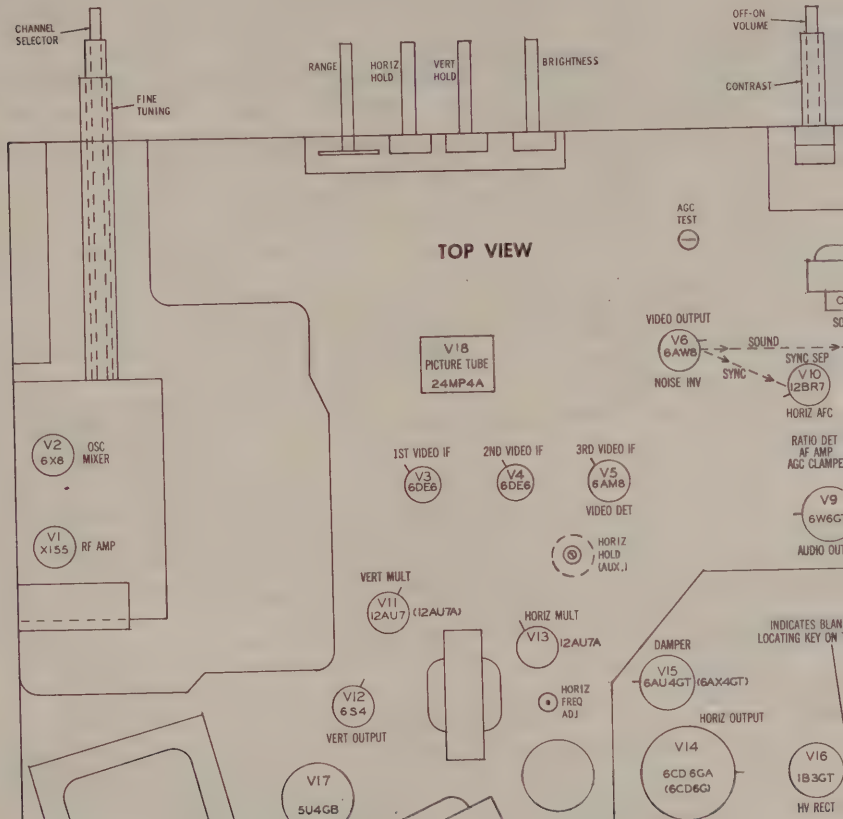


AND ALIGNMENT IDENTIFICATION



CHASSIS BOTTOM VI

TUBE PLACEMENT CHART



"	"	45.5MC	"	"	A7	
"	"	44.0MC	"	"	A8	"
"	69MC (6MC Swp.)	67.25MC 70.25MC	"	"		Set the fine tuning at its Check for response cur in Fig. 2. If necessary A8 for correct respons A4 and A7 for proper c A8 to level curve top. for proper slope of cur side. Make SLIGHT re If unable to obtain prop repeat steps 3 thru 7.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

tched 100KΩ (±1%) resistors in series from point Ⓓ to chassis. The junction of these two resistors is alignment p

V3, 1st Video IF Tube) from its socket and set the volume control for normal volume.

SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
side to point Ⓑ. ide to chassis.	4.5MC (Unmod.)	Any	DC probe to point Ⓓ. Common to chassis.	A9, A10	Adjust for maximum deflection.
"	"	"	DC probe to point Ⓔ. Common to point Ⓗ.	A11	Adjust for zero reading. A positi ing will be obtained on either side Replace V3 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

E6 (V3, 1st Video IF Tube) from its socket.
modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflecti

SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMA
ide to point Ⓑ. ide to chassis.	4.5MC (450KC Swp.)	4.5MC	Any	Vert. amp. to point Ⓓ. Low side to chassis.	A9, A10	Disconnect stabilizing Increase generator for scope. Adjust for cur tude and symmetry of
"	"	"	"	Vert. amp. to point Ⓔ. Common to chassis.	A11	Reconnect C2. Increa for useable pattern on that 4.5MC occurs at shown in Fig. 4. SLI for maximum amplitu crossover lines. Rep

4.5MC TRAP ALIGNMENT

ast control fully clockwise.

SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
side to point Ⓑ. side to chassis.	4.5MC (Unmod.)	Any	DC probe to pin 11 of picture tube. Low side to chassis.	A12	Remove V3 from its socket. Ad deflection. Replace V3 in its soc

ALTERNATE 4.5MC TRAP ADJUSTMENT

set and tune in a TV station. Turn the fine tuning control clockwise until a 4.5MC beat pattern appears in the pictu
5MC beat in the picture.

OSCILLATOR ALIGNMENT

e white wire going to tuner AGC from main chassis. Connect the negative lead of a 1.5 volt bias battery to the loo
positive lead to chassis.
synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal defle
enerator output lead should be terminated with its characteristic impedance, usually 50Ω.
uning control to the mid-position of its range.

SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REA
ss antenna termi- with 120Ω in each	Not used	257MC	13	Vert. amp. thru 1K to point Ⓒ. Low side to chassis.	A13	Adjust for zero beat tion occurs, increas necessary.
		251MC	12		A14	
		245MC	11		A15	
		239MC	10		A16	
		233MC	9		A17	

ALIGNMENT INSTRUCTIONS (cont)

RF AND MIXER ALIGNMENT

Connect the bias as in "Oscillator Alignment". Disconnect the tuner coupling link at the IF terminal strip near V3 and solder a 68Ω resistor across the open ends of the lead from the tuner. Remove V3 from its socket. Adjust the scope controls so that the width is double the height. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Fig. 1.	Across antenna terminals thru matching network (Fig. 1).	213MC (10MC Swp.)	213MC	13	Vert. amp. thru 1KΩ to point ◇. Low side to chassis.	A24, A25	Check for response similar to Fig. 5. If response is not flat between limits shown, detune A25 counter clockwise until single peak appears. Adjust A24 until peak falls on 213MC marker. Adjust A25 for response similar to Fig. 5.
13.	"	"	177MC (10MC Swp.)	177MC	7	"	A26, A27	Check for response indicated by dotted lines in Fig. 6A and 6B. If necessary, adjust for mirror image of original response curve, (tilt in opposite direction). If response curve appears as in Fig. 6A, adjust A26 and A27 until curve appears as in Fig. 6B. This adjustment overcompensates to allow for channel 13 adjustment. Repeat steps 12 and 13 until centered and symmetrical curves are obtained on channels 7 and 13.
14.	"	"	85MC (10MC Swp.)	85MC	6	"	A28, A29, A30	Adjust for symmetrical response approximately center of bandpass. Adjust A29 counter clockwise until single peak appears. Adjust A28 until peak falls on 85MC marker. Adjust A30 for maximum curve amplitude and symmetry of single peak. Retouch SLIGHTLY if necessary, A28 and A29 for symmetrical response centered at approximately the 85MC marker point similar to Fig. 5.
15.	"	"	44MC (10MC Swp.)	44MC	UHF Position	"	A28, A29, A30, A31	Check response curve for symmetrical response centered at approximately 44MC. If necessary, retouch SLIGHTLY, A28, A29, A30, and A31 for symmetrical response centered at approximately the 44MC marker point. Repeat step 14 to be sure channel 6 (85MC) is within proper limits on response curve similar to Fig. 5. Remove 68Ω resistor and reconnect IF coupling link. Remove bias supply and reconnect AGC line to tuner terminals.

RADIO ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Set volume control to maximum. Output of signal generator should be no higher than necessary to obtain an output reading.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
16.	.1MFD	High side to pin 7 (grid) of 12BE6. Low side to chassis	455KC (400~Mod.)	Radio	Tuning gang fully open	Across secondary of output trans.	A32,A33, A34, A35	Adjust for maximum output.
17.		Loop (Radiated)	1620KC	"	1620KC	"	A36	"
18.		"	580KC	"	580KC	"	A37	"
19.		"	1500KC	"	1500KC	"	A38	"

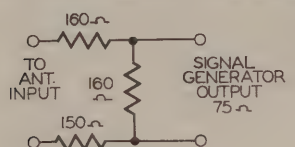


FIG. 1

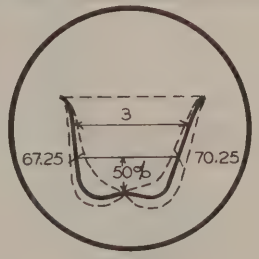


FIG. 2

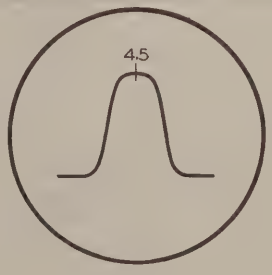


FIG. 3

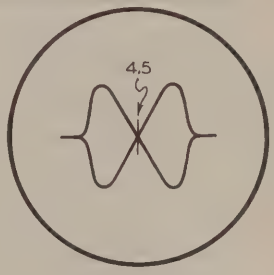


FIG. 4

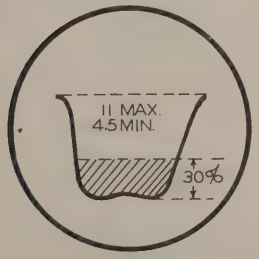


FIG. 5

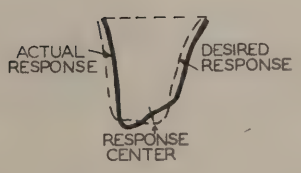


FIG. 6A

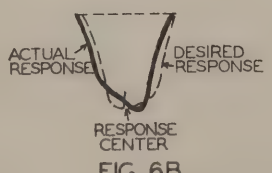
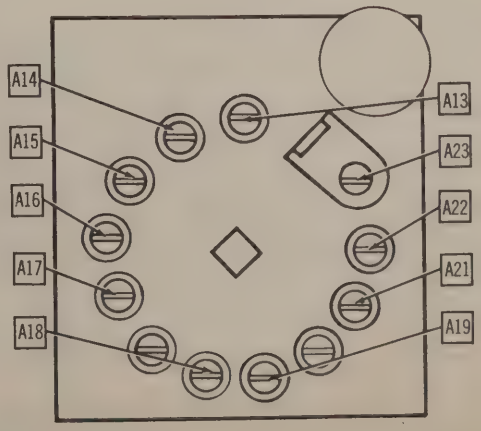


FIG. 6B

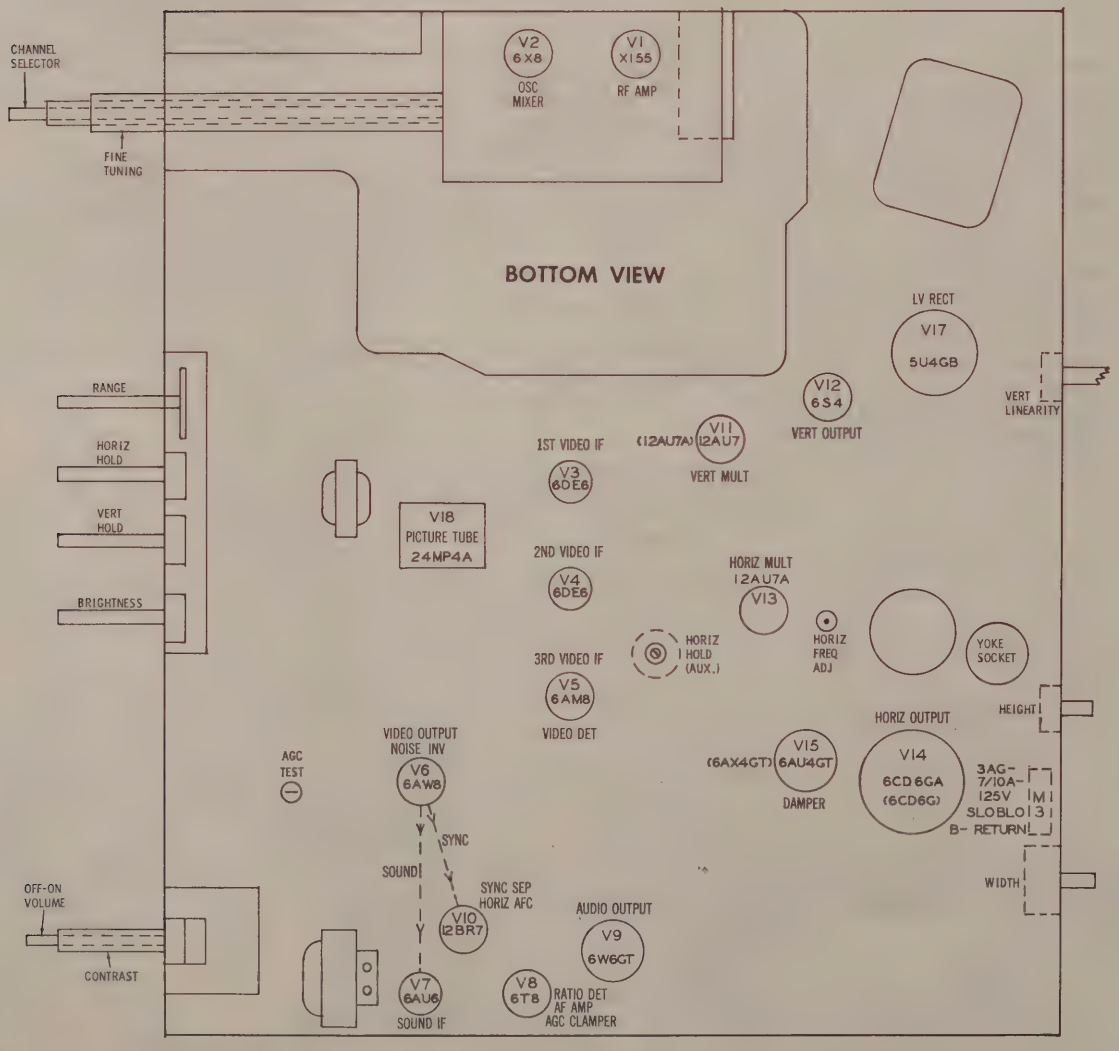


PHILCO MODELS 22D4034, L, 22D4140, L, 22D4144, L, 22D4152, HM, M, 22D4156, L, 22D4159, L, 22D4160, L, 22D4324HM, L, 22D4326 (Ch. TV390, TV392)

RESISTANCE MEASUREMENTS

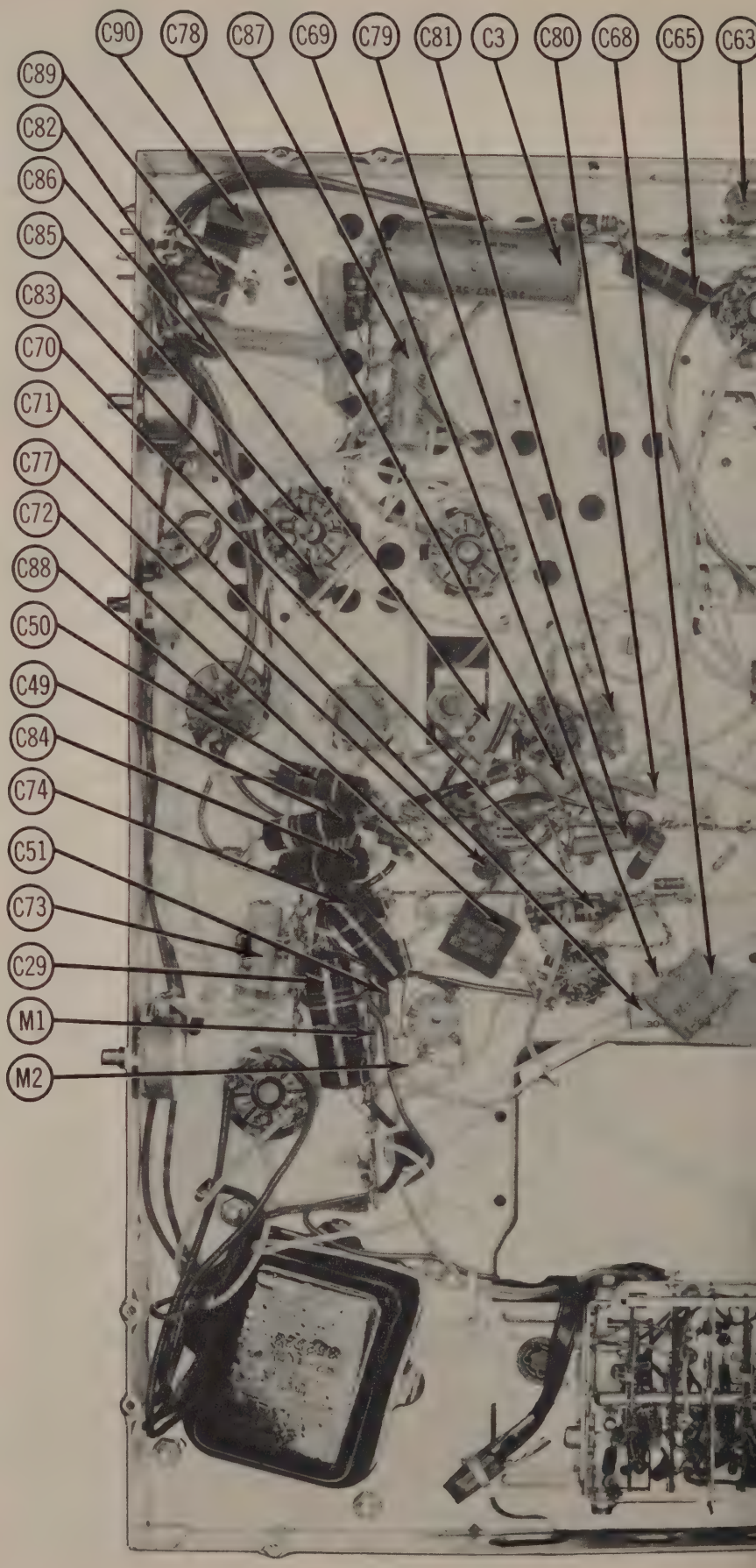
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	X155	† 1.2KΩ	250KΩ	INF	0Ω	.1Ω	INF	3Meg	0Ω	0Ω
V 2	6X8	0Ω	22KΩ	† 47KΩ	0Ω	.1Ω	0Ω	100KΩ	† 17KΩ	† 8.5KΩ
V 3	6DE6	350KΩ	47Ω	0Ω	.1Ω	■ 660Ω	■ 660Ω	0Ω		
V 4	6DE6	350KΩ	68Ω	0Ω	.1Ω	■ 330Ω	■ 330Ω	0Ω		
V 5	6AM8	220Ω	.1Ω	■ 1KΩ	.1Ω	0Ω	■ 1KΩ	.1Ω	3.9KΩ	0Ω
V 6	6AW8	5.6KΩ	3.5Meg	† 18KΩ	.1Ω	0Ω	82Ω	400KΩ	20KΩ	† 5KΩ
V 7	6AU6	4.8Ω	0Ω	0Ω	.1Ω	■ 27KΩ	■ 27KΩ	330Ω		
V 8	6T8	300KΩ	22KΩ	300KΩ	0Ω	.1Ω	3Meg	0Ω	3.3Meg	† 270KΩ
V 9	6W6GT	TP	.1Ω	† 240Ω	† 40Ω	600KΩ	TP	0Ω	■ 220Ω	
V 10	12BR7	† 70KΩ	1.5Meg	0Ω	.1Ω	.1Ω	1Meg	0Ω	390KΩ	0Ω
V 11	12AU7	▲ 230KΩ	1Meg	680Ω	.1Ω	.1Ω	▲ 1.5Meg	3Meg	680Ω	0Ω
V 12	6S4	NC	500Ω	1.2Meg	.1Ω	0Ω	1.2Meg	NC	NC	▲ 8KΩ
V 13	12AU7A	† 18KΩ	5Meg	1.2KΩ	0Ω	0Ω	† 50KΩ	100KΩ	1.2KΩ	.1Ω
V 14	6CD6G	TP	0Ω	0Ω	TP	1Meg	TP	.1Ω	† 8KΩ	TOP CAP ▲ 40Ω
V 15	6AU4GT	NC	NC	80KΩ	NC	† 42Ω	NC	.1Ω	0Ω	
V 16	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 770Ω
V 17	5U4GB	NC	50KΩ	NC	26Ω	NC	25Ω	NC	50KΩ	
V 18	21AMP4A	0Ω	1Meg	PIN 10 ▲ 8KΩ	PIN 11 † 200KΩ	PIN 12 .1Ω				

† MEASURED FROM PIN 2 OF V17.
■ MEASURED FROM 135V LINE.
▲ MEASURED FROM PIN 3 OF V15.
TP-TIE POINT.
NC-NO CONNECTION.

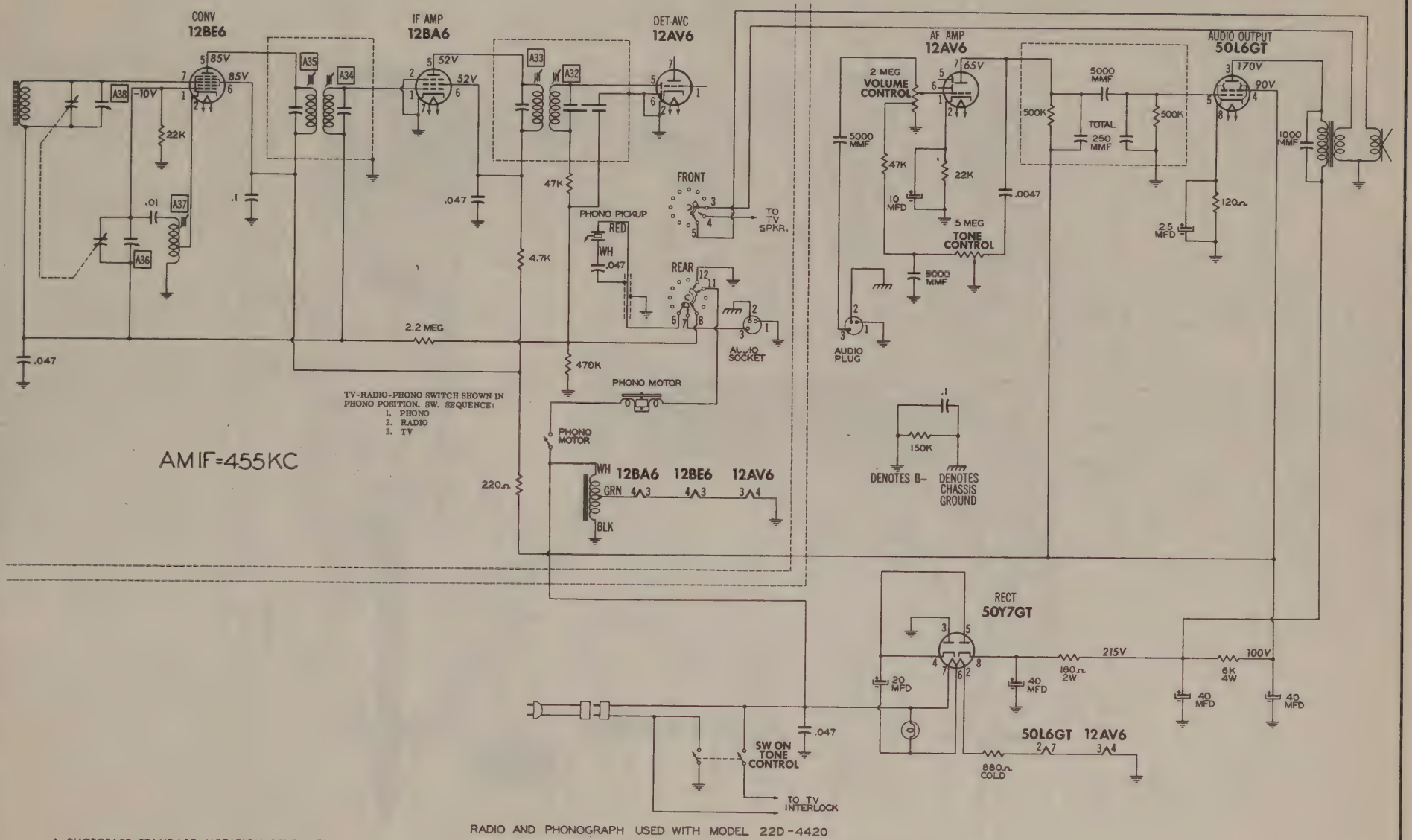


TUBE PLACEMENT CHART

ND INDUCTOR IDENTIFICATION



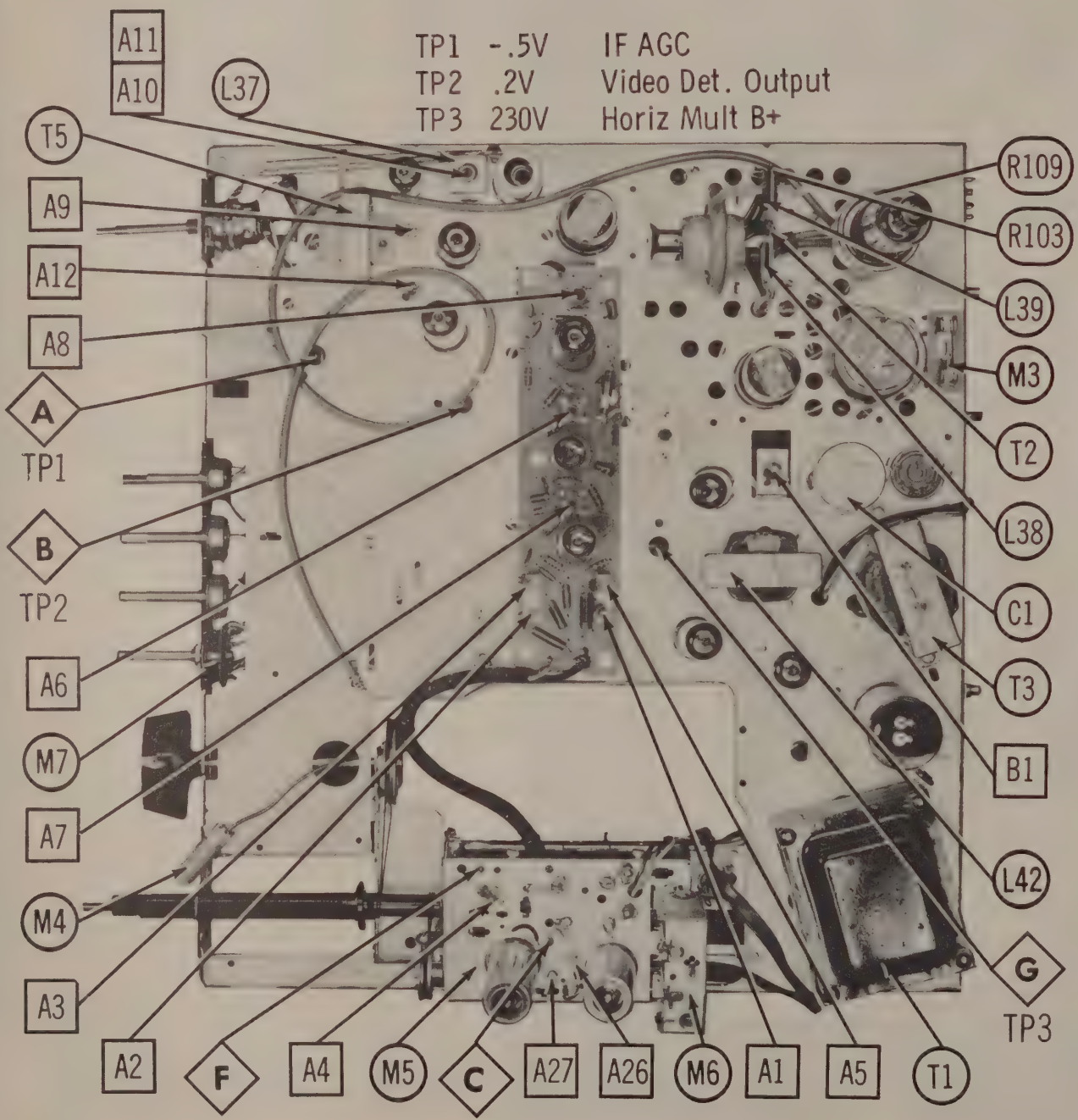
CHASSIS BOTTOM VIEW-CAPAC



RADIO AND PHONOGRAPH USED WITH MODEL 22D-4420

AM RADIO TUNER & AUDIO AMPLIFIER CIRCUIT SCHEMATIC

PHILCO MODELS 22D4034, L, 22D4140, L, 22D4144, L, 22D4152, HM, M, 22D4156, L, 22D4159, L, 22D4160, L, 22D4324HM, L, 22D4326 (Ch. TV390, TV392)



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		PHILCO PART No.	STANDARD REPLACEMENT	
V1	RF Amplifier	X155		
V2	Mixer-Oscillator	6X8	6X8	
V3	1st. Video IF Amplifier	6DE6	6DE6	
V4	2nd. Video IF Amplifier	6DE6	6DE6	
V5	3rd. Video IF Amplifier-Video Detector	6AM8	6AM8	
V6	Video Output-Noise Inverter	6AW8	6AW8	
V7	Sound IF Amplifier	6AU6	6AU6	
V8	Ratio Detector-AF Amp. - AGC Clamper	6T8	6T8	
V9	Audio Output	6W6GT	6W6GT	
V10	Sync Separator-Horiz. AFC	12BR7	12BR7	
V11	Vert. Mult.	12AU7	12AU7	12AU7A may be used in some versions
V12	Vert. Output	6S4	6S4	
V13	Horiz. Mult.	12AU7A	12AU7A	
V14	Horiz. Output	6CD6G	6CD6G	6CD6GA may be used in some versions
V15	Damper	6AU4GT	6AU4GT	
V16	HV Rectifier	1B3GT	1B3GT	
V17	LV Rectifier	5U4GB	5U4GB	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	PHILCO PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V18	21AMP4A ①	21AMP4A ①	21AMP4A/21ACP4A ①	21AMP4A ②	① Aluminized ② Silver screen "85"
				21ACP4A ②	
	-	21AMP4	21AMP4/21ACP4	21AMP4	
				21ACP4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	400	30-2584-54	RE1036		FP333.2	TM4116	T-552	R2219 *
B	■80	350				TC1265	TD-80-150	MT-25100	
C	▲100	200							
D	100	50							
C2	2	50	45-3035-4	PRS50V2	BBR2-50T	TC302	TD-2-50	MT-0502	TVA-1301
C3	40	300	30-2417-52	PRS350V40	BR4035	TC78	TD-40-350	FM-4540	TVA-1611
C4A	■40	300	30-2584-66 (Note 1)	E3C602	C022	FP333.6	TM-202010-350	T-505	R2221 *
B	▲10	350						MT-4520	
C	5	150	(Note 2)						

Note 1. Late production versions use Mfgr. part #30-2590.
Note 2. C4C is not used.
* Unit must be ordered from Mfgr.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	33		62-03340901I	NP0-SI33	TCZ-33	TZ18	NP0L-330	ZT-5433	5TCC-Q33	
C6	1000		30-1245-6							
C7	150		62-11500100I	NP0-SI150	TCZ-150	TZ34	NP0-334-151	ZT-5315	5TCC-T15	
C8	150		62-11500100I	NP0-SI150	TCZ-150	TZ34	NP0-334-151	ZT-5315	5TCC-T15	
C9	.5-3		31-6520-3		829-3		3139-01-0R5	CT565A		
C10	220		62-12200101I	NP0-SI220	TCZ-220	TZ38	811-221	UC-5322	5TCC-T22	
C11	150		62-11500100I	BPD-00015	DD-151	G046	811-151	ZT-5315	5GA-T15	
C12	.59									
C13	27		30-1224-126		TCZ-27	TZ16	NP0L-270			
C14	15			NP0-SI15	TCZ-15	TZ11	NP0K-150		5TCC-Q15	
C15	3.3		30-1224-103	NP0-SI3.3	TCZ-3R3	TZ06	NP0A-3R3	ZT-5533	5TCCB-V33	
C16	1.3									
C17	.5-3		31-6520-3		829-3		3139-01-0R5	CT565A		
C18	1.5		30-1224-127							
C19	2.2		30-1221-6	NP0-SI2.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C20	12		30-1255				N330K-120			
C21	12		30-1255				N330K-120			
C22	220		62-12200101I	SI220	D6-221	TP39	811-221	UC-5322	5GA-T22	
C23	1000		30-1245-6							
C24	10000		30-1238-2	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C25	680		62-16800101I	SI680	D6-681	TP50	811-681	UC-5368	5GA-T68	
C26	1000		30-1245-6							
C27	1000		30-1245-6							
C28	7.5		30-1224-37							
C29	.22	200	30-4650-49	P288N-22		CUB2P22		PT4022	2TM-P22	
C30	3.3		30-1224-58		TCN-3R3		N750A-3R3			
C31	1-5		31-6520-19		829-6					
C32	.5-3		31-6520-21		829-3		3139-01-0R5	CT565A		
C33	1500		30-1238-15	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C34	1-7.5		31-6520-20		829-7					
C35	1-5		31-6520-19		829-6					
C36	680		62-16800101I	SI680	D6-681	TP50	811-681	UC-5368	5GA-T68	
C37	1500		30-1238-15	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C38	680		62-16800101I	SI680	D6-681	TP50	811-681	UC-5368	5GA-T68	
C39	27		30-1224-126		TCZ-27	TZ16	NP0L-270			
C40	680		62-16800101I	SI680	D6-681	TP50	811-681	UC-5368	5GA-T68	
C41	1500		30-1238-15	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C42	1500		30-1238-15	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C43	5		30-1224-38	NP0-DI5	DI-00005	G011	NP0A-050	ZT-555	5GA-V5	
C44	.047	200	30-4650-45	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C45	.0047	200		BPD-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	Note 3
C46	68		60-06840901I	NP0-SI68	D6-680	TZ26	801-680		5TCC-Q68	
C47	68		62-06840900I	NP0-SI68	D6-680	TZ26	801-680		5TCC-Q68	
C48	.1	400	30-4650-47	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C49	.047	400	30-4650-62	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C50	.022	600	30-4650-60	BPD-02	DF-203	CUB4S22	817-02	PT6122	6TM-S22	
C51	680		62-16800101I	SI680	D6-681	TP50	801-680	UC-5368	5GA-T68	

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C52	1000		30-1238-3	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C53	5000		30-1238-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C54	10000		30-1238-2	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C55	.1	200	30-4650-47	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C56	2.2		30-1221-6	NP0-SI2.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C57	18		62-018300001	SI18	D6-180	G022	831-180	UC-5418	5GA-Q18	
C58	3000		30-1238-16	DI-003	DD-302	K076	811-003	UC-523	5GA-D3	
C59	5000		30-1238-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C60	1500		30-1238	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C61	.0033	200	30-4650-55	BPD-0033	D6-332	CUB6D33	GP2-333-332	PT6233	6TM-D33	
C62	.022	200	30-4650-43	BPD-02	DF-203	CUB2S22	817-02	PT4122	2TM-S22	Note 4
C63	5000		30-1238-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C64	3300		30-1238-17	BPD-003	D6-332	K077	811-0033	UC-5233	5HK-D33	
C65	.022	600	30-4650-60	BPD-02	DF-203	CUB6S22	817-02	PT6122	6TM-S22	Note 5
C66	470		62-147001001	SI470	D6-471	TP46	811-471	UC-5347	5GA-T47	
C67	150		62-115001001	SI150	D6-151	TP36	GP2K-151	UC-5315	5GA-T15	
C68A	4000				D6-402	K078	811-004	UC-5240	5HK-D4	
B	10000		†30-6008-1	†PA-367-2	DD-103	K082	811-01	DC-511	5HK-S1	
C	10000				DD-103	K082	811-01	DC-511	5HK-S1	
C69	.022	200	30-4650-43	BPD-02	DF-203	CUB2S22	817-02	PT4122	2TM-S22	
C70	.0033	400	30-4650-55	BPD-0033	D6-332	CUB6D33	GP2-333-332	PT6233	6TM-D33	
C71	.033	200	30-4650-44	BPD-03	DF-303	CUB6S33		PT4133	6TM-S33	
C72	10000	600	30-4650-58	BPD-01	DD-103	CUB6S1	811-01	PT6111	6TM-S1	
C73	.047	400	30-4650-45	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C74	.1	400	30-4650-64	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	Note 6
C75	68		62-068409011	NP0-SI68	D6-680	TP32	801-680		5GA-Q68	
C76	120	500	60-10125237	NP0-SI120	TCZ-120	22R5T12	811-121		5GCC-T12	
C77A	1000		30-1239-14	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
B	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C78A	1000		♦30-6009-3	♦PA-366-4						
B	14000									
C79	2200	500	60-20225434	1464-0022		1R5D22			MS-222	
C80	82	500	60-00825437	1469-00082	D6-820	TZ38	801-820		MS-482	
C81	390	500	60-10395437	1469-00039	D6-391	5R5T39	811-391		MS-339	
C82	390	500	60-10395437	1469-00039	D6-391	5R5T39	811-391		MS-339	
C83	5000		30-1238-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C84	.1	200	30-4650-47	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C85	15	1000		HVD-15-15	DD-150	VQ15	1R5KV-150	DC30415	10GA-Q15	Notes 7, 8
C86	10000		30-1238-2	BPD-01	DD-103	K082	811-01	DC-521	5HK-S1	
C87	.033	600	30-4650-61	BPD-03	DF-303	CUB6S33		PT6133	6TM-S33	
C88	82	4000	30-1246-4							
C89	10000	600	30-4650-58	BPD-01	DD-103	K082		PT611	10HK-S1	
C90	10000	600	30-4650-58	BPD-01	DD-103	K082		PT611	10HK-S1	

† Items C68A, C68B, C68C, R79A, R79B, R79C and R79D are combined in one unit.
♦ Items C78A, C78B, R92A and R92B are combined in one unit.
Note 3. Early versions use a .0039MFD unit (part #30-4681-1) in this application.
Note 4. Early versions use a .01MFD unit in this application.
Note 5. Early versions use a .033MFD unit in this application.
Note 6. In chassis run 6, C74 was changed to a .01MFD unit (part #30-1238-6).
Note 7. Some versions use a 22MMF unit. Other versions use a 27MMF (part #30-1251-11) in series with C12.
Note 8. In chassis run 1Z, C12 is not used.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	PHILCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	15KΩ	½	33-5573		RTV-513	* QJ-642	UE796S	Contrast tapped at 10K (Panel) Volume & Switch tapped at 160K (Rear)
B	250KΩ	½						
R1A	15KΩ	½	33-5573-12		RTV582	**QJ-1002	UE780	Contrast tapped at 7K (Panel) Note 1
B	250KΩ	½						Volume tapped at 125K (Rear)
R2A	100KΩ	½	33-5572-16	B-40	A47-100K-S	Q11-128	TA15L	Brightness
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A.
R3A	3Meg	½	33-5572-14	B-84	A47-3Meg-S	Q11-140	TA36L	Vert. Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A.
R4A	50KΩ	½	33-5572-8	B-31	A47-50K-S	Q11-123	TA54L	Horiz. Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A.
R5	12.5KΩ	2	33-5574			WPK-12, 500		Width-Wire Wound
R6A	2.5Meg	½	33-5572-1	BX-83	A47-2.5Meg-S	Q11-239	TA255L	Height
B	Shaft		Not Req.	Not Req.	FKS-½	RQ	Not Req.	Attach to R6A.
R7A	1500Ω	½	33-5565-90	AB-6	A47-1500-S	Q11-109	TA152L	Vert. Linearity-Note 2
B	Shaft		Not Req.	AK-1	FKS-1/4	RQ	Not Req.	Attach to R7A.
R7A	1500Ω	½	33-5572-13	AB-6	A47-1500-S	Q11-109	TA152L	Vert. Linearity
B	Shaft		Not Req.	AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R7A.
R8A	250KΩ	½	33-5572	AB-50	A47-250K-S	Q11-130	TA254L	Horiz. Oscillator
B	Shaft		Not Req.	AK-1	FKS-½	RQ	Not Req.	Attach to R8A.

Note 1. Used in Chassis TV392 only.
Note 2. Some versions will use an alternate control Part No. 33-5572-13 in this application.
* Concentrikit Equivalent: K-2 Kit, Base Elements & Shafts; B13-118X & P1-128 (Panel)
B13-130X & R1-212 (Rear)
76-1 (Switch)
** Concentrikit Equivalent: K-6 Kit, Base Elements & Shafts; B13-118X & P13-128 (Panel)
B13-130X & R1-209 (Rear)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	PHILCO PART No.	IRC PART No.	NOTES
R9	470KΩ	½	66-4478340	BTS-470	
R10	22KΩ	½	66-3228340	BTS-22K	
R11	470KΩ 5%	½	66-4478340	BTS-470K	
R12	470KΩ 5%	½	66-4478340	BTS-470K	
R13	1000Ω	½	66-2108340	BTS-1000	
R14	680Ω	½	66-1688340	BTS-680	
R15	22KΩ	½	66-3228340	BTS-22K	
R16	2700Ω	½	66-2278340	BTS-2700	
R17	220Ω	½	66-1228340	BTS-220	
R18	1500Ω	½	66-2158340	BTS-1500	
R19	100KΩ	½	66-4108340	BTS-100K	
R20	8200Ω	½	66-2828340	BTS-8200	
R21	8200Ω	2	66-2825340	BTB-8200	
R22	220Ω	½	66-1228340	BTS-220	
R23	47KΩ	1	66-3478340	BTA-47K	
R24	150KΩ	½	66-4158340	BTS-150K	
R25	2.2Meg	½	66-5228340	BTS-2.2Meg	
R26	1.2Meg 5%	½	66-5128240	BTS-1.2Meg 5%	
R27	1Meg	½	66-5108340	BTS-1Meg	Note 1
R28	5.6Meg 5%	½	66-5568240	BTS-5.6Meg 5%	
R29	15Meg	½	66-6158340	BTS-15Meg	
R30	8.2Meg	½	66-5828240	BTS-8.2Meg	Note 2
R31	6.8Meg	½	66-5688240	BTS-6.8Meg	Note 3
R32	2.2Meg	½	66-5228340	BTS-2.2Meg	
R33	220KΩ	½	66-4228340	BTS-220K	
R34	47KΩ	½	66-3478340	BTS-47K	
R35	47KΩ	½	66-3478340	BTS-47K	
R36	330Ω	½	66-1338340	BTS-330	
R37	47Ω	½	66-0478340	BTS-47	
R38	1000Ω	½	66-2108340	BTS-1000	
R39	18KΩ	½	66-3188340		
R40	330Ω	½	66-1338340	BTS-330	
R41	68Ω	½	66-0688340	BTS-68	
R42	1000Ω	½	66-2108340	BTS-1000	
R43	220Ω	½	66-1228340	BTS-220	
R44	3900Ω	½	66-2398340	BTS-3900	
R45	470KΩ	½	66-4478340	BTS-470K	
R46	3900Ω	½	66-2398340	BTS-3900	
R47	470KΩ	½	66-4478340	BTS-470K	
R48	3.3Meg	½	66-5338340	BTS-3.3Meg	
R49	12KΩ	½	66-3128340	BTS-12K	
R50	1200Ω	1	66-2124340	BTA-1200	
R51	5600Ω	7	33-1335-134		
R52	82Ω	½	66-0828340	BTS-82	
R53	2200Ω	½	66-2228340	BTS-2200	
R54	150KΩ	½	66-4158340	BTS-150K	
R55	220KΩ	½	66-4228340	BTS-220K	
R56	6800Ω	½	66-2688340	BTS-6800	

PARTS LIST AND DI
RES

ITEM No.	RATING OHMS	RATING WATT	PHILCO PART No.	IRC PART No.	NOT
R57	1Meg	½	66-5108340	BTS-1Meg	
R58	27KΩ	½	66-3278340	BTS-27K	
R59	330Ω	½	66-1338340	BTS-330	
R60	22KΩ	½	66-3228340	BTS-22K	
R61	390Ω	½	66-1398340	BTS-390	
R62	47KΩ	½	66-3478340	BTS-47K	
R63	68KΩ	½	66-3688340	BTS-68K	
R64	3.3Meg	½	66-5338340	BTS-3.3Meg	
R65	270KΩ	½	66-4278340	BTS-270K	
R66	1000Ω	½	66-2108340	BTS-1000	
R67	1.5Meg	½	66-5158340	BTS-1.5Meg	
R68	1Meg	½	66-5108340	BTS-1Meg	
R69	220Ω	1	66-1224340	BTA-220	
R70	2.2Meg	½	66-5228340	BTS-2.2Meg	
R71	220KΩ	½	66-4228340	BTS-220K	
R72	15KΩ	½	66-3158340	BTS-15K	
R73	5600Ω 5%	½	66-2568240	BTS-5600 5%	
R74	33KΩ	1	66-3334340	BTA-33K	
R75	150KΩ	½	66-4158340	BTS-150K	
R76	8200Ω	½	66-2828340	BTS-8200	
R77	27KΩ	½	66-3278340	BTS-27K	
R78	8200Ω	½	66-2828340	BTS-8200	
R79A	10KΩ			BTS-10K	
B	10KΩ			BTS-10K	
C	8200Ω		† 30-6008-1	BTS-8200	
D	1Meg			BTS-1Meg	
R80	220KΩ	1	66-4224340	BTA-220K	
R81	680Ω 5%	½	66-1688240	BTS-680 5%	
R82	1.8Meg	½	66-5188340	BTS-1.8Meg	
R83	117KΩ ③				
	65° Hot		33-1343-7		Note
	760KΩ ③				
	25° Cold				

Note 1. In chassis marked run 4 and abov
Note 2. In chassis marked run 4 and abov
Note 3. In chassis marked run 4 and abov
Note 4. Temperature compensating resist
Note 5. Some versions use a 10KΩ ½W res
Note 6. Not used in some versions.
Note 7. Not used in chassis marked below
† Items R79A, R79B, R79C, R79D, C68A, C
♦ Items R92A, R92B, C78A, C78B are comb

TRANSFOR

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	PHILC PART N
T1	117VAC	535VCT	5V	6.3V	32-8711 ①
	③ 1.72A	③ .260A	③ 3A	③ 10.6A	32-8719 ②

① Used in chassis TV-390.
② Used in chassis TV-392.

TRANSFORMERS

ITEM No.	USE	PHILCO PART No.	Halldorson PART No.	M PAR
T2	Horiz. Output Trans.	32-8705-1 ①	FB419 * ②	HVC
T3	Vert. Output Trans.	32-8704	Z1900 ③	
T4A	Yoke(90°) Horiz. (31MH)	32-9689-1 ⑤	④	
B	Vert. (46MH)			

① Includes coil and resistor assembly L39.
② Drill new mounting hole(s).
③ Use 12.5 to 1 turns ratio.
④ Connect as auto transformer.
⑤ Includes resistors R88 and R89.
⑥ Use original core clamp.
⑦ Use original yoke damping network if necessary.
⑧ Connect horizontal yoke terminal # 3 to yoke plug pin #5

*HORIZONTAL OUTPUT T

Use Original Width Co

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Rep Co
	12	9	9	
	11	7	7	
	2	7	7	
	6	N. C. See Note ⑨	N. C. See Note ⑨	N. Not
	1	3	3	
	9	N. C.	N. C.	N
Special Notes →		⑨	⑨	

⑨ Connect R104 in series with C88 (adjust value if nec
pins #5 and #3).
⑩ Jumper terminals #1 and #2.
⑪ Jumper terminals #4 and #7.

TRANSFORMER

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT PHILCO PART No.	Halldorson PART No.	Merit PART No.
T5	2.6KΩ	3-4Ω	32-8718		

SPE

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMEN PHILCO PART No.	QUAN PART N
SP1	8"	PM	3-4Ω	36-1651-10	8A21

PTIONS (Continued)
(cont)

M	RATING OHMS	RATING WATT	REPLACEMENT DATA PHILCO PART No.	REPLACEMENT DATA IRC PART No.	NOTES
4	470KΩ	½	66-4478340	BTS-470KΩ	
5	10KΩ	½	66-3108340	BTS-10K	
3	470KΩ	½	66-4478340	BTS-470K	
7	1Meg	½	66-5108340	BTS-1Meg	
8	1000Ω	½			
9	1000Ω	½			
0	390KΩ	½	66-4398340	BTS-390K	
	680KΩ	½	66-4688340	BTS-680K	
2A	4. 7Meg		♦30-6009-3		
B	220K Ω				
3	15KΩ	1	66-3154340	BTA-15K	
4	1200Ω	½	66-2128340	BTS-1200	
5	56KΩ	½	66-3568340	BTS-56K	
6	8200Ω	½	66-2828340	BTS-8200	
7	39KΩ	½	66-3398340	BTS-39K	
8	6800Ω	½	66-2688340	BTS-6800	Note 5
9	3300Ω 5%	½	62-2338340	BTS-3300	
0	680KΩ	½	66-4688340	BTS-680K	
1	220KΩ	½	66-4228340	BTS-220K	
2	5000Ω	7	33-1335-95	PW7-5000	
3	47Ω	½			Note 6
4	1000Ω	½	66-2108340		
5	8200Ω	10	33-1335-119	PW10-8200	
6	150KΩ	1	66-4154340	BTA-150K	
7	150KΩ	1	66-4154340	BTA-150K	
8	68KΩ	2	66-3685340	BTB-68K	
9	3. 9Ω 5%	½	66-9398340	BW½-3. 9	
0	100KΩ	½	66-4104340	BTS-100K	
	68KΩ	½	66-3688340		Note 7

5% resistor is used in this application.
resistor is used in this application.
W 5% resistor is used in this application.

application.

re combined in one unit.
nit.

OWER)

REPLACEMENT DATA dorson T No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.

CIRCUITS)

CEMENT DATA A No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
* ②	X094 * ②	A-8253 * ②	FLY-16 * ②	D-50 * ②
			Y-15 ⑥ ⑦ ⑧	A-109X ④

#7 to plug #3; yoke #1 to plug #8.

MER CONNECTION DATA

acement Type is Listed

Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
9	8	9	9
7	1	7	7
7	1	7	7
I. C. See Note ⑨	N. C. See Note ⑨	N. C. See Note ⑨	N. C. See Note ⑨
6	6	3	3
N. C.	N. C.	N. C.	N. C.
⑨ ⑩	⑨ ⑪	⑨	⑨

ss horizontal yoke terminals #1 and #2. (Yoke socket

O OUTPUT)

Thordarson PART No.	Triad PART No.	NOTES

A No.	NOTES
2	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	REPLACEMENT DATA MEISSNER PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA MILLER PART No.	NOTES
L1	VHF Ant. Matching Trans	. 7Ω	. 7Ω	32-4432-3				
L2	VHF Ant. Matching Trans	. 7Ω	. 7Ω	32-4432-3				
L3	IF Trap	0Ω						Wound on 22MMF Cap.
L4	UHF IF Coil	0Ω						
L5	UHF IF Coil	0Ω						
L6	VHF Ant. Coil	0Ω						Channel 13
L7	VHF Ant. Coils	0Ω						
L8	VHF Ant. Coil	0Ω						Channel 6
L9	Neut. Coil	0Ω						
L10	VHF RF Coil	0Ω						Channel 13
L11	VHF RF Coils	0Ω						
L12	VHF RF Coil	0Ω						Channel 6
L13	VHF Mixer Grid Coil	0Ω						Channel 13
L14	VHF Mixer Grid Coils	0Ω						
L15	VHF Mixer Grid Coil	0Ω						Channel 6
L16	VHF Osc. Coil	0Ω		76-9231				Channel 13-Part of complete assembly
L17	VHF Osc. Coils	0Ω		76-9231				
L18	RF Coil	0Ω						
L19	Conv. Plate	0Ω		32-4359-16				Tapped
L20	47.25MC Trap	0Ω		32-4645-3	19-1002		4606	
L21	47. 25MC Trap	. 4Ω		32-4645-1				
L22	41. 25MC Trap	. 3Ω		32-4645-4	19-1000		4602	
L23	RF Coil	0Ω		32-4645	19-1003		4608	
L24	1st Video IF	. 1Ω		32-4645-2				
L25	2nd Video IF	. 1Ω	. 1Ω	32-4644				
L26	Ell. Choke	. 1Ω		32-4112-49				
L27	3rd Video IF	. 1Ω	. 1Ω	32-4644-1				
L28	4th Video IF	. 1Ω	. 1Ω	32-4644-2				
L29	Series Peaking Coil	2. 2Ω		32-4674	19-6022		6152	22 Microhenries
L30	Series Peaking Coil	1. 4Ω		32-4112-52				3 Microhenries
L31	Shunt Peaking Coil	6. 2Ω		32-4480-4	19-3250	TV-185	6181	250 Microhenries
L32	Series Peaking Coil	6Ω		32-4480-18	19-3160	TV-184	4644	150 Microhenries
L33	4. 5MC Trap	1. 8Ω		32-4463-11				
L34	Series Peaking Coil	6Ω		32-4480-4	19-3250	TV-185	6181	250 Microhenries
L35	Series Peaking Coil	6Ω		32-4480-4	19-3250	TV-185	6181	250 Microhenries
L36	Sound IF	4. 3Ω		32-4463-14				
L37	Ratio Det.	8Ω	1. 1ΩCT	32-4631-1A	17-3497	TV-115	6205	Tertiary Winding=1. 3Ω
L38	RF Choke	1. 9Ω		32-4112-50	19-1006		4624	15 Microhenries
L39	RF Choke	2. 5Ω						17. 5 Microhenries; Wound on 22Ω 1W resistor-Note 1
L40	RF Choke	2Ω		32-4112-50	19-1006		4624	15 Microhenries

Note 1. Part of T2, horizontal output transformer.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L41	168Ω		32-4557-4							

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA PHILCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L42	. 260A	40Ω	1. 3HY	32-8710	C5037 ①			26C44	C-23X

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA PHILCO PART No. FUSE	PHILCO PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	2" pc. #26 wire							
M2	2" pc. #26 wire							
M3	3AG S/B	7/10A 125V	AD-2246-15	76-4519-2	313. 700 (3AG S/B 7/10A)	357001	MDL 7/10	4405

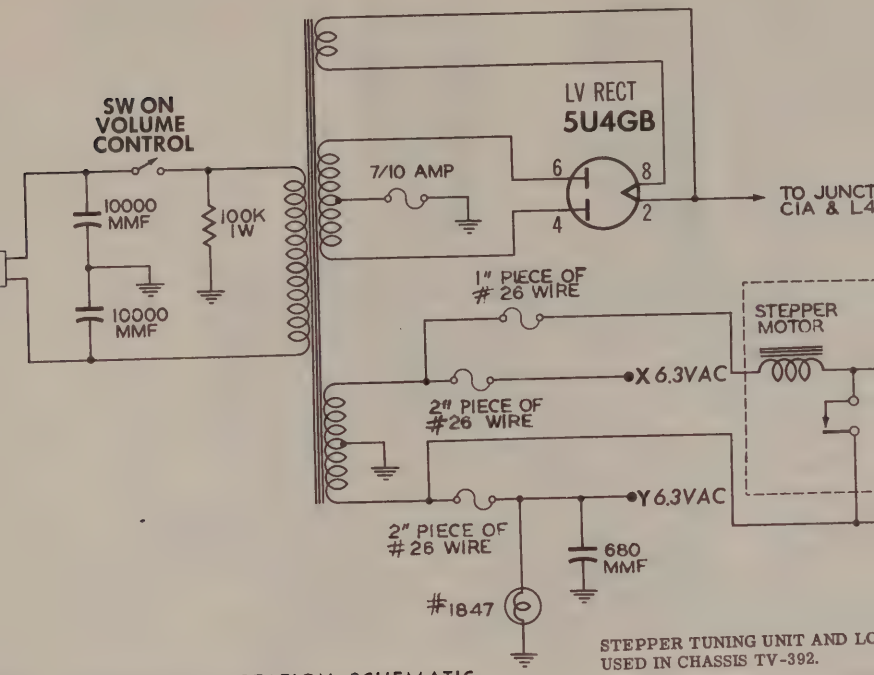
MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M4	Dial Light	3463-4	#1847
M5	Tuner	76-8946-9	VHF (T-37A-1) - Chassis TV-390
	Tuner	76-8946-8	VHF (T-37B) - Chassis TV-392, Not used in some versions
	Tuner	76-8946-11	VHF (T-37B-1) - Chassis TV-392, Not used in some versions
M6	Ant. Matching Network	76-9204	Includes L1, L2, L3, R9, Used with tuner part numbers 76-8946-9 and 76-8946-8.
	Ant. Matching Network	76-9998	Used with tuner part #76-8946-11
M7	Switch	42-2047	Range (Rotary, wafer type)
M8	Switch	42-2053-1	On-off (Power), chassis TV-392 only
M9	Focus Magnet	76-9511-1	Includes centering device
M10	Ion Trap	76-6077	
	Cabinet	11154-2	Model 22D4324L
	Cabinet	11154-1	Model 22D4326
	Cabinet	11154	Model 22D4324HM
	Cabinet	11119	Model 22D4152M
	Cabinet	11143-2	Model 22D4156
	Cabinet	11130-9	Light - Model 22D4159
	Cabinet	11130-4	Mahogany- Model 22D4159
	Cabinet	11144-1	Model 22D4140L
	Cabinet	11144	Model 22D4144
	Cabinet	11143-3	Model 22D4156L
	Cabinet	11130-6	Model 22D4160

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS (cont)

ITEM No.	PART NAME	PHILCO PART No.	NOTES
	Cabinet	11132-4	Model 22D4041
	Cabinet	11132-5	Model 22D4041L
	Cabinet	11179	Model 22D4145
	Cabinet	11134	Model 22D4151
	Cabinet	11134-1	Model 22D4151L
	Cabinet	11174	Model 22D4157
	Cabinet	11130-12	Model 22D4160
	Cabinet	11130-13	Model 22D4160XL
	Cabinet	11175	Model 22D4161
	Cabinet	11175-1	Model 22D4161L
	Cabinet	11119-2	Model 22D4165
	Cabinet	11160	Model 22D4420
	Cabinet	11160-2	Model 22D4420L
	Cabinet	11160-1	Model 22D4422
	Knob	54-6204	Brightness, contrast, horiz. hold, vert. hold- Model 22D4324HM
	Knob	54-6140-3	Brightness, horiz. hold, vert. hold - Models 22D4324L, 22D4156, 22D4156L, 22D4160L, 22D4140L, 22D4144L, 22D4152HM, 22D4034, 22D4034L, 22D4041, 22D4041L, 22D4134, 22D4134L, 22D4151, 22D4160KL, 22D4161L, 22D4165, 22D4420, 22D4420L, 22D4422
	Knob	54-6140-1	Brightness, horiz. hold, vert. hold - Models 22D4326, 22D4159, 22D4160, 22D4144, 22D4140, 22D4145, 22D4157, 22D4160, 22D4161
	Knob	54-6140-1	Horiz. hold, vert. hold - Model 22D4152M
	Knob	54-6140-4	Model 22D4151L
	Knob	76-7143	Brightness
	Knob	76-6213-6	Contrast - Models 22D4324L, 22D4326, 22D4152M, 22D4156, 22D4156L, 22D4159, 22D4160, 22D4160L, 22D4140L, 22D4144, 22D4144L, 22D4144L, 22D4152HM, 22D4034, 22D4034L, 22D4140, 22D4041, 22D4041L, 22D4134, 22D4134L, 22D4145, 22D4151, 22D4151L, 22D4157, 22D4160, 22D4160XL, 22D4161, 22D4161L, 22D4165, 22D4420, 22D4420L, 22D4422
	Knob	76-6104-9	Fine tuning - Models 22D4324L, 22D4326, 22D4152M, 22D4156, 22D4156L, 22D4159, 22D4160, 22D4160L, 22D4140L, 22D4144, 22D4144L, 22D4152HM, 22D4034, 22D4034L, 22D4140, 22D4041, 22D4041L, 22D4134, 22D4134L, 22D4145, 22D4151, 22D4151L, 22D4157, 22D4160, 22D4160, 22D4161, 22D4161L, 22D4165, 22D4420, 22D4420L, 22D4422
	Knob	54-6196	Fine tuning - Model 22D4324HM
	Knob	76-9278	Tone - Model 22D4324HM
	Knob	54-6140-2	Range switch - Models 22D4326, 22D4152M, 22D4159, 22D4160, 22D4144, 22D4140, 22D4041, 22D4041L, 22D4134, 22D4134L, 22D4151, 22D4160XL, 22D4161L, 22D4165, 22D4420, 22D4420L, 22D4422
	Knob	54-6140	Range switch - Models 22D4326, 22D4152M, 22D4159, 22D4160, 22D4144, 22D4140, 22D4145, 22D4157, 22D4160, 22D4161
	Knob	54-6140-5	Range switch - Model 22D4151L
	Knob	76-9118-8	Channel selector - Models 22D4324L, 22D4160L, 22D4140L, 22D4152HM, 22D4034, 22D4034L, 22D4041, 22D4041L, 22D4134, 22D4134L, 22D4151, 22D4160XL, 22D4161L, 22D4165, 22D4420, 22D4420L
	Knob	76-9118-7	Channel selector - Models 22D4326, 22D4159, 22D4160, 22D4144, 22D4140, 22D415, 22D4157, 22D4160, 22D4161
	Knob	76-9118	Channel selector - Model 22D4422
	Knob	76-9118-1	Channel selector - Model 22D4151L
	Knob	76-9722	Channel selector - Model 22D4324HM
	Knob	3363-2	Channel selector - Model 22D4152M
	Knob	3363-3	Channel selector - Models 22D4156, 22D4156L
	Knob	54-6137-1	On-off-volume - Models 22D4324L, 22D4156, 22D4156L, 22D4160L, 22D4140L, 22D4144L, 22D4152HM, 22D4034, 22D4034L, 22D4041, 22D4041L, 22D4134, 22D4134L, 22D4151, 22D4160XL, 22D4161L, 22D4165, 22D4420, 22D4402L, 22D4422
	Knob	54-6137	On-off-volume - Models 22D4326, 22D4152M, 22D4159, 22D4160, 22D4144, 22D4140, 22D4145, 22D4157, 22D4160
	Knob	54-6137-13	On-off-volume - Model 22D4151L
	Knob	54-6198	On-off-volume - Model 22D4324HM
	Pushbutton	54-9591	On-off- Models 22D4324L, 22D4144, 22D4144L, 22D4041, 22D4041, 22D4145, 22D4161, 22D4161L, 22D4165, 22D4420, 22D4420L, 22D4422
	Pushbutton	54-9591-2	On-off - Model 22D4324HM
	Pushbutton	54-9591-1	Stepper tuner - Models 22D4324L, 22D4041, 22D4041, 22D4145, 22D4161, 22D4161L, 22D4165, 22D4420, 22D4420L, 22D4422
	Pushbutton	54-9591-1	On-off - Models 22D4326, 22D4140
	Knob	76-8457-11	Function switch - Model 22D4422
	Knob	76-8457-12	Phono volume - Model 22D4422
	Knob	76-6048-9	Treble - Model 22D4422
	Knob	76-8457-13	Bass - Model 22D4422
	Knob	54-4773-29	On-off, tone, volume - Model 22D4420 (Radio)
	Knob	54-4773-31	On-off, tone, volume - Model 22D4422 (Radio)
	Knob	54-4773-30	Function switch - Model 22D4420 (Radio)
	Knob	54-4773-32	Function switch - Model 22D4420L (Radio)
	Knob	54-4978-12	Tuning - Model 22D4420 (Radio)
	Knob	54-4978-13	Tuning - Model 22D4420L (Radio)
	Mask	28-10792-4	Models 22D4324L, 22D4326, 22D4152HM, 22D4152M, 22D4165
	Mask	28-10792-6	Model 22D4324HM
	Mask	28-10616-7	Models 22D4156, 22D4156L, 22D4140L, 22D4034, 22D4034L, 22D4140, 22D4041, 22D4041L, 22D4134, 22D4134L
	Mask	28-10792-2	Models 22D4159, 22D4160, 22D4160L, 22D4157, 22D4160, 22D4160XL, 22D4161, 22D4161L
	Mask	28-10616-5	Models 22D4144, 22D4144L, 22D4151, 22D4151L, 22D4420, 22D4420L, 22D4422
	Mask	28-10792-1	Model 22D4145
	Safety Glass	54-9213-50	Models 22D4324L, 22D4326, 22D4152M, 22D4152HM, 22D4165
	Safety Glass	54-9213-60	Model 22D4324HM
	Safety Glass	54-9213-56	Models 22D4156, 22D4156L, 22D4140L, 22D4034, 22D4034L, 22D4140, 22D4041, 22D4041L, 22D4134, 22D4134L
	Safety Glass	54-9213-59	Models 22D4159, 22D4160, 22D4160L, 22D4145, 22D4157, 22D4160, 22D4160XL, 22D4161, 22D4161L
	Safety Glass	54-9213-53	Models 22D4144, 22D4144L, 22D4151, 22D4151L, 22D4420, 22D4420L, 22D4422



STEPPER TUNING UNIT AND LO
USED IN CHASSIS TV-392.

OFACT STANDARD NOTATION SCHEMATIC

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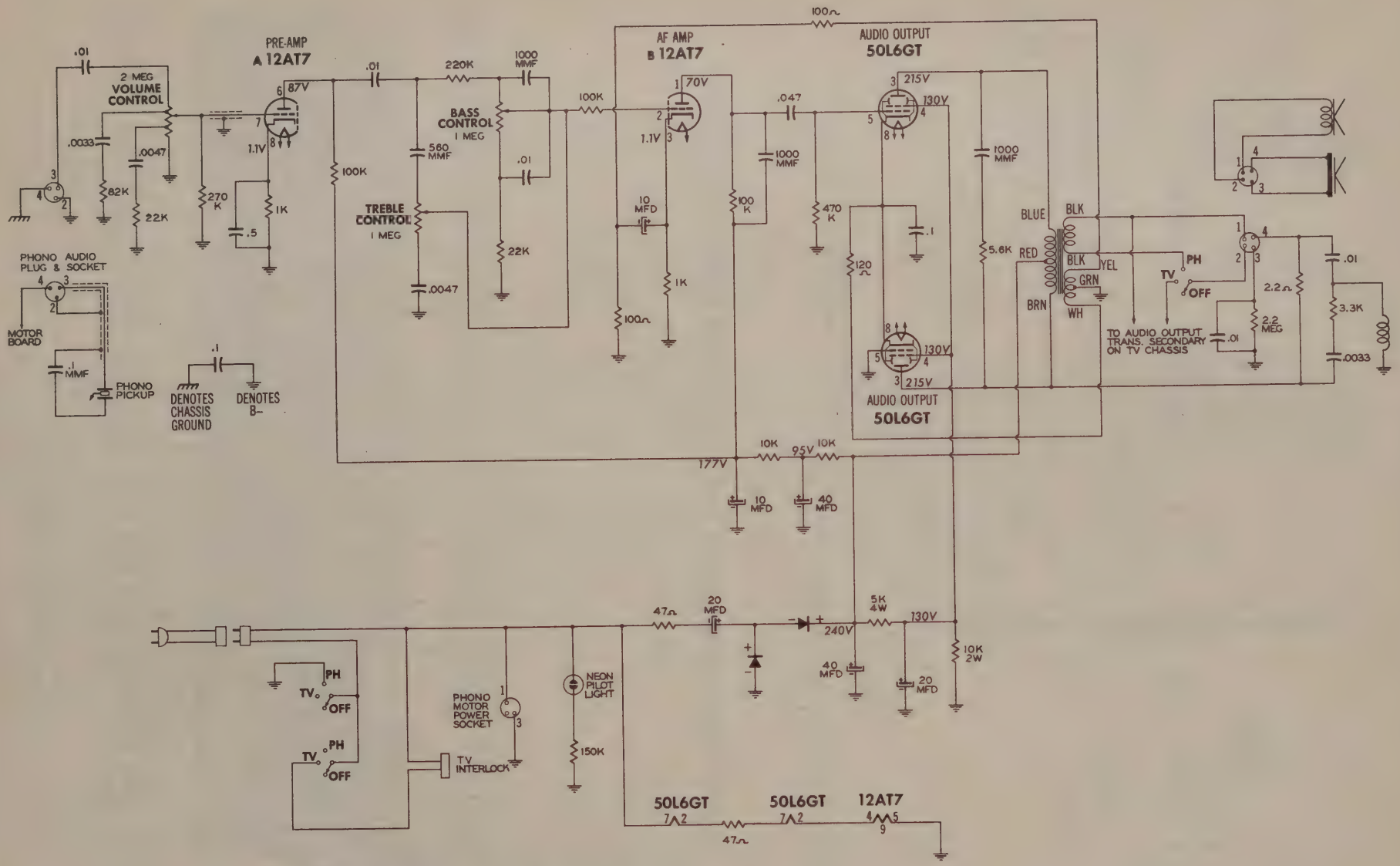

PHONOGRAPH AMPLIFIER USED WITH MODEL 22D-4422

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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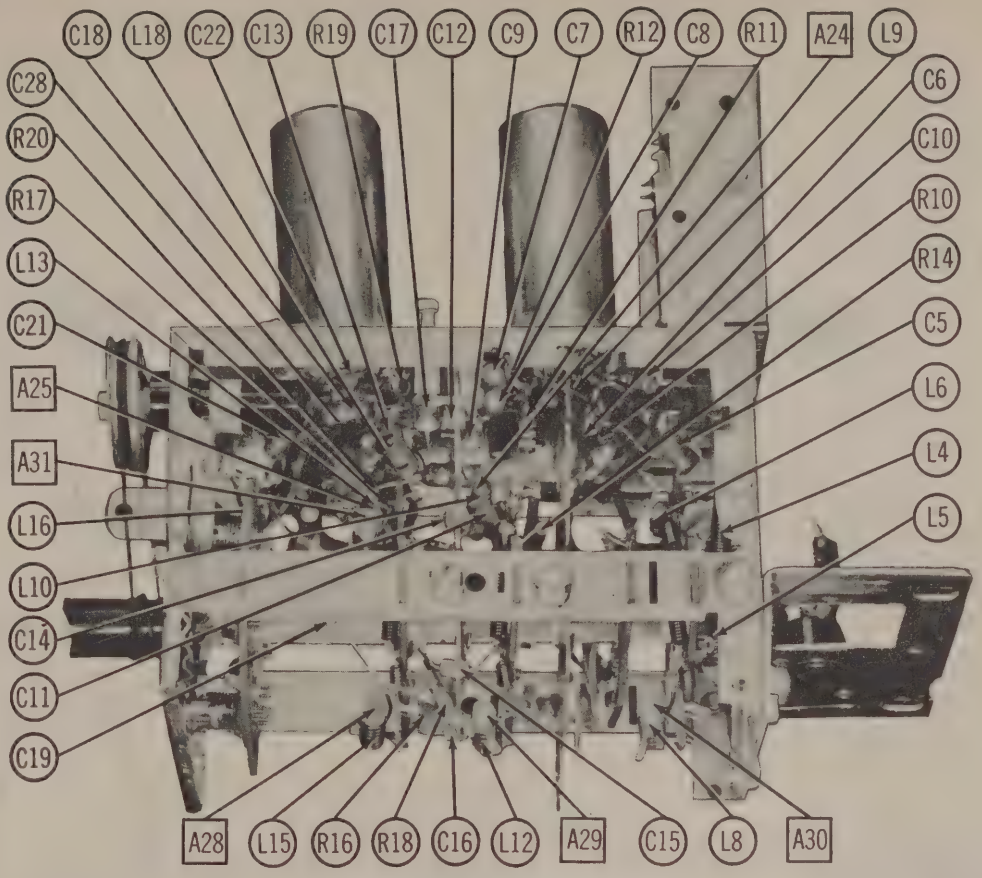
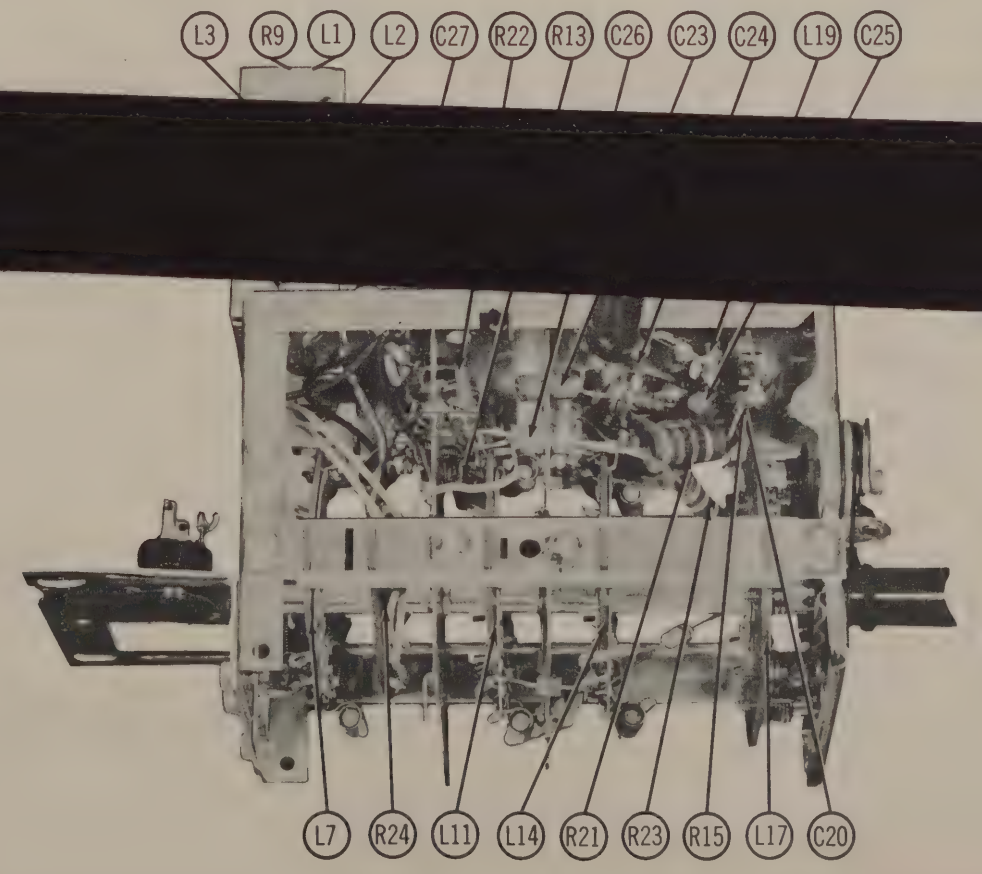
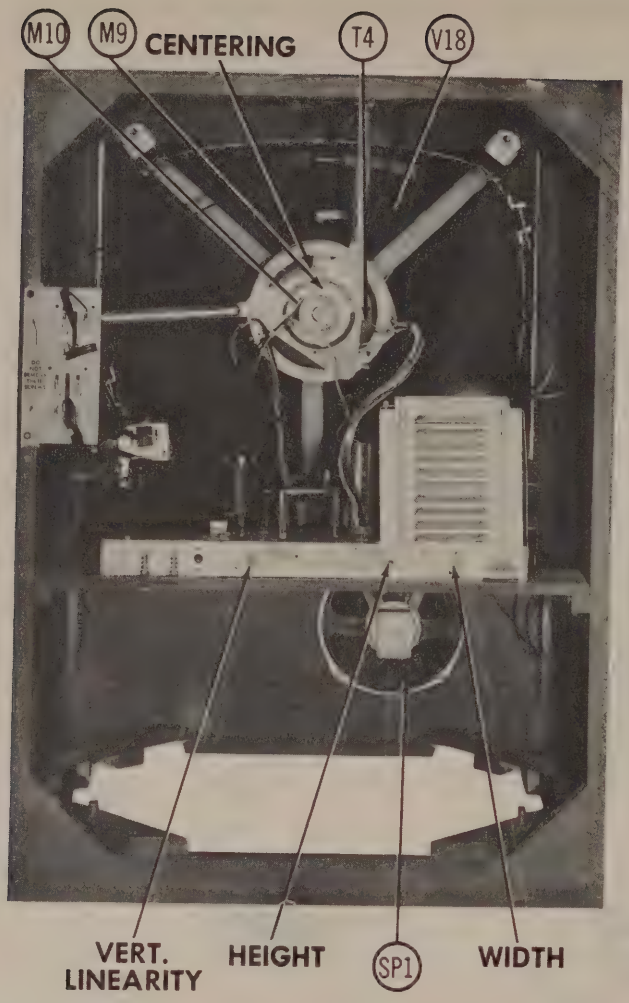
AUDIO AMPLIFIER CIRCUIT SCHEMATIC



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CABINET—REAR VIEW

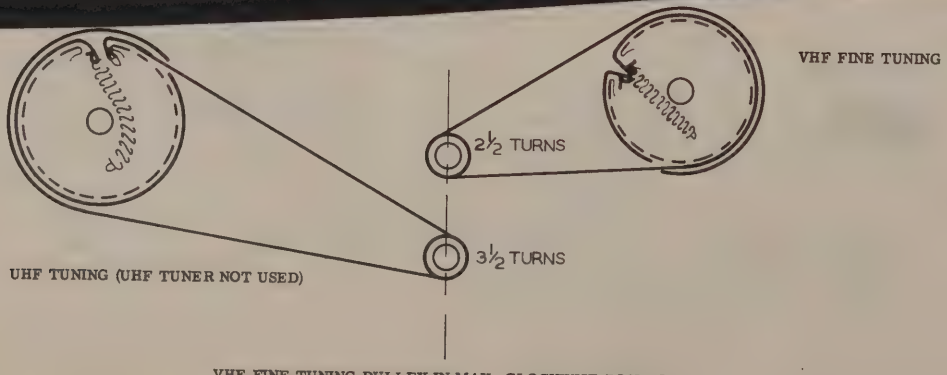
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune in a TV station, preferably with a test pattern. Reduce the picture width until approximately on inch of blank screen appears on each side of the picture.

Increase the brightness control setting until the blanking becomes visible indicated by a black bar at each side of the picture. Connect a [illegible]

Adjust the horizontal frequency coil slug (B1) until the picture is again centered between the two blanking bars.

Rotate the horizontal hold control slowly thru its [illegible] should lose sync at [illegible]



UHF DRIVE CORD STRINGING

RCA VICTOR MODELS
6-BY-4A, B (Ch. RC1153, A)

RCA VICTOR MODELS
6-BY-4A, B (Ch. RC1153, A)

TRADE NAME	RCA Victor Models 6-BY-4A (Ch. RC-1153), 6-BY-4B (Ch. RC-1153A)
MANUFACTURER	RCA Victor Radio & "Victrola" Div., Radio Corp. of America, Camden, N. J.
TYPE SET	Battery Operated Portable AM Superheterodyne Receiver With Manual 45RPM Record Player
TUBES(Four)	Types 1R5 Converter, 1U4 IF Amplifier, 1U5 Det. -AVC-AF Amp., 3V4 Output
POWER SUPPLY RATING	(Radio) 1.5 Volts "A" Supply & 90 Volts "B" Supply In Pack Form, (Phono) 6 Volts DC (Radio) 225MA @ 1.5 Volts DC & 10MA @ 90 Volts DC, (Phono) 25MA @ 6 Volts DC
TUNING RANGE—BROADCAST	540KC - 1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.005MFD	High side to ant. lug on tuning gang. Low side to chassis.	455KC (400~ mod)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop (radiated).	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal.	"	A6	"
4.		"	600KC	Tune to 600KC signal.	"	A7	Adjust for maximum output while rocking tuning gang.

L. F. BY ANKENSHIP
3324 MEADE ST.
DENVER, COLORADO

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ITEM No.	USE	REPLACEMENT DATA		NOTES
		RCA Victor PART No.	STANDARD REPLACEMENT	
V1	Converter	1R5	1R5	
V2	IF Amplifier	1U4	1U4	
V3	Det. -AVC-AF Amplifier	1U5	1U5	
V4	Output	3V4	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	RCA Victor PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	50	100	101231	PRS150V50	BR5015	TC49	TD-50-150	FM-1550	TVA-1414

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	200	73558	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C3	56		100085	SI56	D6-560	TP31	GP1K-560	UC-5456	5GA-Q56	
C4	.01	200	79316	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C5	.0033	400	73795	SI3300	D6-332	CUB6D33	GP2-333-332	PT6233	5HK-D33	
C6	3		101233	NPO-SI-3.3	TCZ-3R3	TZ06	NPOA-030	ZT-553	5TCCB-V33	
C7	120		78142	SI120	D6-121	TP35	GP2K-121	UC-5312	5GA-T12	
C8	.0039	400	73796	SI4000	D6-402	CUB6D4	GP2-333-402	PT624	5HK-D4	
C9	.01	200	79316	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C10	56		101702	SI56	D6-560	TP31	GP1K-560	UC-5456	5GA-Q56	Note 1
C11	.022	200	79925	BPD-02	DD-203	CUB4S22	817-02	PT4122	4TM-S22	
C12	56		101232	SI56	D6-560	TP31	GP1K-560	UC-5456	5GA-Q56	
C13	.0022	200	77942	SI2200	D6-222	CUB6D22	GP2-333-222	PT6222	6TM-D22	
C14	.0039	400	73796	SI4000	D6-402	CUB6D4	GP2-333-402	PT624	6TM-D4	

Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA Victor PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	101228	B-70-S	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	Not Req.	SWE-20	76-2	US-27	Attach to R1A

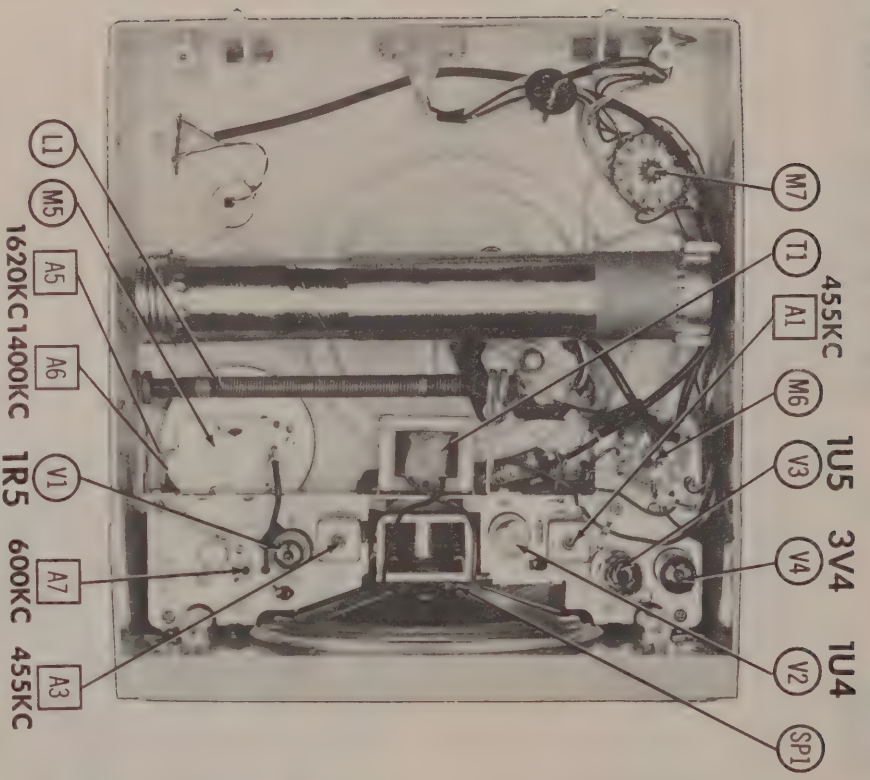
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R2	3.9Meg	½	502539	BTS-3.9Meg	
R3	100KΩ	½	502410	BTS-100K	
R4	22KΩ	½	502322	BTS-22K	
R5	4.7Meg	½	30931	BTS-4.7Meg	
R6	68KΩ	½	502368	BTS-68K	
R7	5600Ω	½	502256	BTS-5600	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R8	10Meg	½	502610	BTS-10Meg	
R9	1Meg	½	502510	BTS-1Meg	
R10	10Meg	½	502610	BTS-10Meg	
R11	1Meg	½	502510	BTS-1Meg	
R12	470Ω	½	502147	BTS-470	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	9.5KΩ	3.3Ω	970608-22	Z1000①	A-2932①	A3850①	24S60①	S-17X①	① Bend ears down to fit cut out.



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	RCA Victor PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4X6	PM	3-4Ω	792233-3	46A07	246S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.4Ω		101100				
L2	Osc. Coil	1.4Ω	6.5Ω	101605	14-1060		71-OSC	
L3	Input IF	18Ω	18Ω	101098	16-6758	BC-352	12-C1	
L4	Output IF	18Ω	18Ω	101099	16-6770	BC-355	12-C6	

BATTERIES

ITEM No.	VOLTAGE	RCA Victor PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M1	1.5V "A" 90V "B"	VS-064			729			4TZ60	
M2	1.5V "A" (Phono Motor Supply)	VS-036	950			2R			Connect 4 in series.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	RCA Victor PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M3	79791	51-1	G-J	44	0-1 or S-1	

ASTATIC AND ELECTRO VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

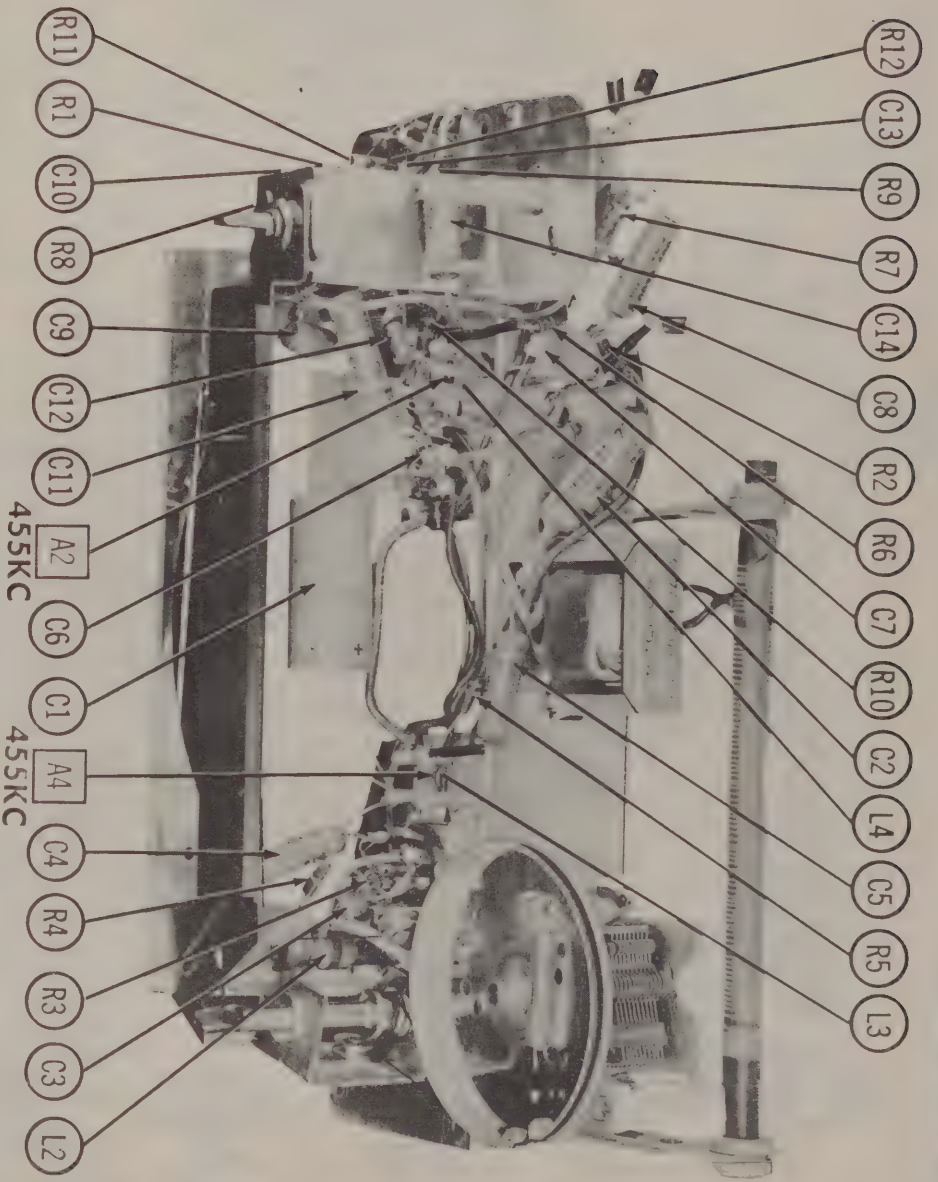
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

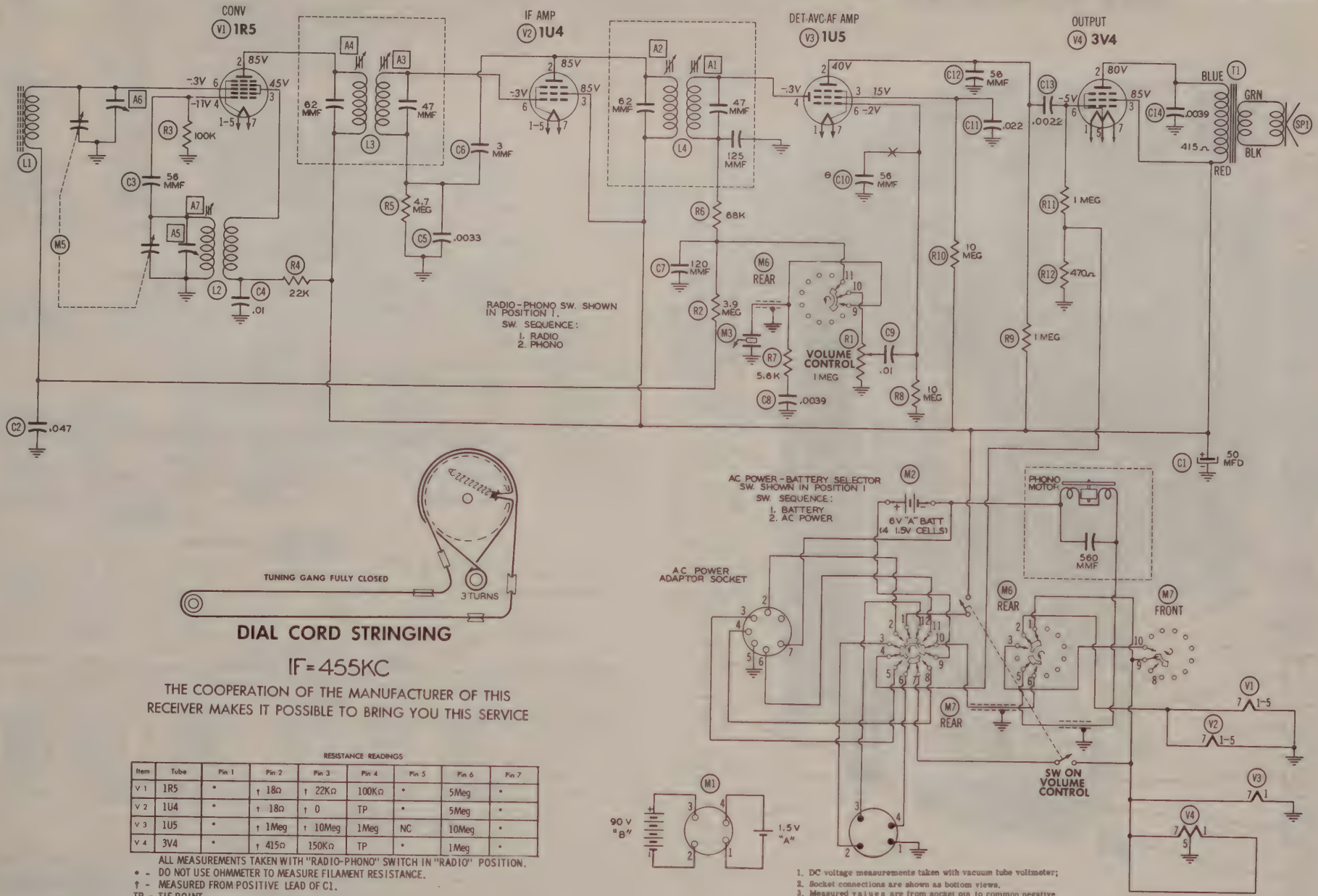
ITEM No.	REPLACEMENT DATA				REMARKS
	RCA Victor PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M4	79849	† S-63LP or ♦ S-63LPD	† A-478 or ♦ A-478D	† W-76MGS or ♦ W-76MGD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M5	Tuning Cap.	101101	2 gang (15-265MMF, 15-120MMF).
M6	Switch	101089	Radio - Phono (Rotary, Wafer Type).
M7	Switch	101092	Battery & AC Power Adaptor (Rotary, Wafer Type).
	Case	Y2850	Less Top Lid & Bottom Cover - Model 6-BY-4A.
	Case	Y2851	Less Top Lid & Bottom Cover - Model 6-BY-4B.
	Cover	Y2852	Bottom Cover - Model 6-BY-4A.
	Cover	Y2853	Bottom Cover - Model 6-BY-4B.
	Lid	Y2848	Model 6-BY-4A.
	Lid	Y2849	Model 6-BY-4B.
	Handle	101090	Carrying
	Knob	101323	AC-Battery Switch - Model 6-BY-4A.
	Knob	101326	AC-Battery Switch - Model 6-BY-4B.
	Knob	101104	On-Off-Volume - Model 6-BY-4A.
	Knob	101322	On-Off-Volume - Model 6-BY-4B.
	Knob	101324	Radio-Phono Switch - Model 6-BY-4A.
	Knob	101327	Radio-Phono Switch - Model 6-BY-4B.
	Knob	101103	Tuning - Model 6-BY-4A.
	Knob	101321	Tuning - Model 6-BY-4B.

CHASSIS—BOTTOM VIEW





DIAL CORD STRINGING

IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	•	† 18Ω	† 22KΩ	100KΩ	•	5Meg	•
V 2	1U4	•	† 18Ω	† 0	TP	•	5Meg	•
V 3	1U5	•	† 1Meg	† 10Meg	1Meg	NC	10Meg	•
V 4	3V4	•	† 415Ω	150KΩ	TP	•	1Meg	•

ALL MEASUREMENTS TAKEN WITH "RADIO-PHONO" SWITCH IN "RADIO" POSITION.
• - DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† - MEASURED FROM POSITIVE LEAD OF C1.
TP - TIE POINT
NC - NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter;
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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WEBCOR
MODELS 140, 141

WEBCOR
MODELS 140, 141

GENERAL INFORMATION

Webcor Record Changer Models 140 and 141 are designed to play and automatically change a 1 inch stack of 7", 10", or 12" records, which (providing they are of the same speed and same type of groove) may be intermixed in any order.

Turntable Speed---------- 33 1/3, 45, or 78 R. P. M.

Record Capacity---------- 1 inch stack of 7", 10" or 12" records.

A single control knob is used to select the desired turntable speeds, initiate a change cycle, and disengage the idler wheel while the unit is not in use to prevent the formation of flat spots on the idler surface. The center spindle incorporates a safety pawl which prevents records from dropping to the turntable while the tone arm is in playing position.

Models 140 and 141 were designed to operate on 105 to 120 volts, 60 cycle A. C. only. A special 50 cycle adaptor kit is available to permit operation from a 50 cycle line.

MANUFACTURED by:

WEBCOR
5610 BLOOMINGDALE AVE.
CHICAGO 39, ILLINOIS

L. F. SUPPENSHIP
3941 MEADE ST.
DENVER, COLORADO

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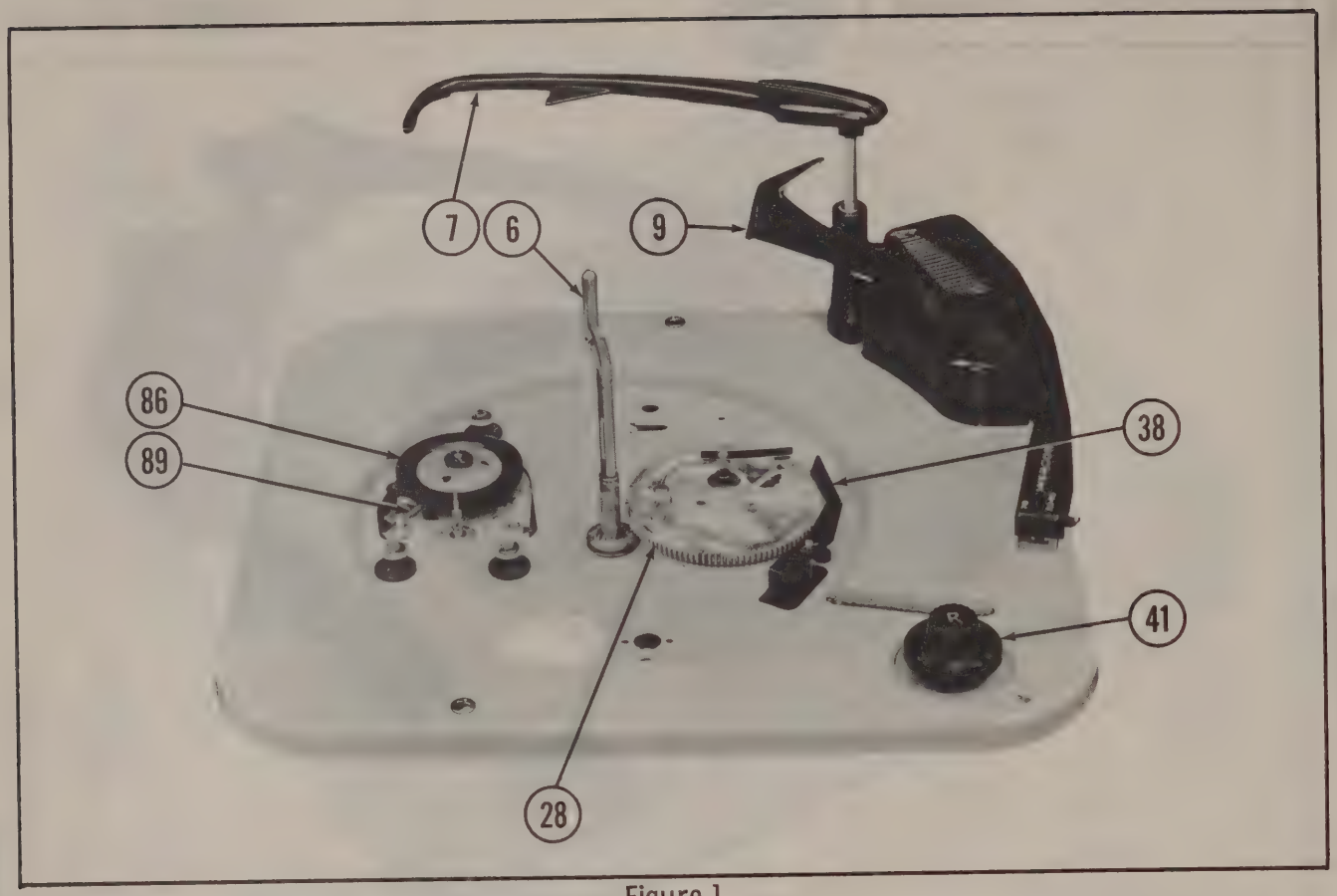


Figure 1

PREPARING FOR OPERATION

Before placing in operation, the changer must be floating freely on its mounting springs. During shipment, the unit is secured by means of two shipping screws (one screw at the front and rear edge of the baseplate). Carefully remove cardboards which protect unit during shipment. Turn the two shipping screws in a clockwise direction until they are flush with the baseplate. The changer is now free-floating and ready to operate.

OPERATING INSTRUCTIONS

1. Release the tone arm from the tone arm rest.

2. Raise the front of the tone arm and remove the needle guard.

3. Lift record overarm and turn away from spindle until it locks in open position.

4. Place up to a 1" stack of records on the spindle. 7", 10", and 12" records may be intermixed so long as they are of the same speed.

5. While holding the records in place with one hand, swing record overarm toward spindle and lower it over the records.

6. Turn needle selector on tone arm to correct position for 33-45, or 78 rpm.

7. Turn the speed control to the speed which corresponds to the type records to be played, 33, 45, or 78 rpm.

8. Depress the combination speed and reject control. Each record in the stack will play and be automatically changed until the last record is played, at which time, the tone arm returns to its rest position and the changer automatically shuts off.

9. To remove records, lift record overarm and swing away from spindle until it locks in open position. Using both hands, with fingers under the edge of bottom record, lift records straight up and off spindle.

NOTE: When the changer is not in use, be sure the selector knob is in its neutral (N) position.

CHANGE CYCLE

Speed Change Mechanism-

The changer mechanism is driven by the motor (83) which transmits power to the turntable by means of idler wheel (86). Turntable speed is determined by the position of idler wheel (86) on one of the three "steps" of the motor shaft. When the reject knob (41) is turned to the "33" position, the idler wheel contacts the smallest diameter portion of the motor shaft. As the knob is rotated to the "45" or "78" positions, the motor shaft is raised so that the wheel is contacted by increasingly larger drive shaft diameters and will, consequently, turn at faster speeds.

Starting The Motor And Change Cycle-

Line voltage is applied to the motor through the plunger-operated microswitch (51). When the plunger is depressed, the switch is open, and the motor is not

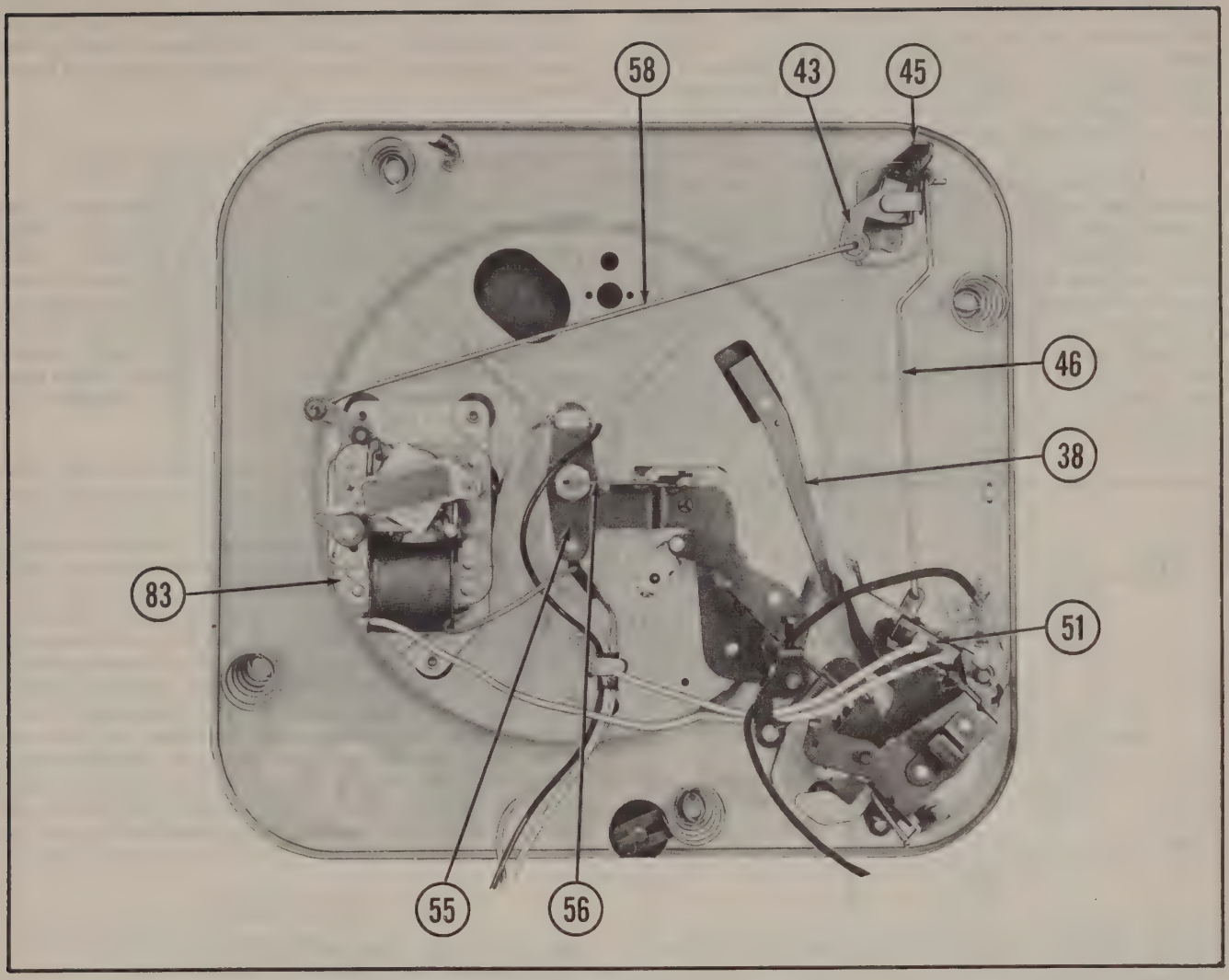


Figure 2

energized. When the plunger is released, the motor is energized and the turntable will be driven by idler wheel (86).

When the reject knob (41) is depressed, the reject rod (46) moves the microswitch (51) from under the shutoff plate (61). This releases the switch plunger and closes the a-c circuit which energizes the motor and starts the turntable rotating.

Simultaneously, the flexible metal bar on switch bracket (50) contacts and applies pressure to the portion of trip bracket (38) which extends below the baseplate. This action causes the portion of trip bracket (38) which extends above the baseplate to contact and move the slide plate (34) in toward the spindle. This, in turn, causes the projection on the hub of the turntable to contact the front edge of slide plate (34). Since the turntable is rotating, the contact between the front edge of slide plate (34) and turntable hub projection gives the necessary push for the teeth in main gear (28) to engage the teeth in the turntable hub, thus causing main gear (28) to rotate.

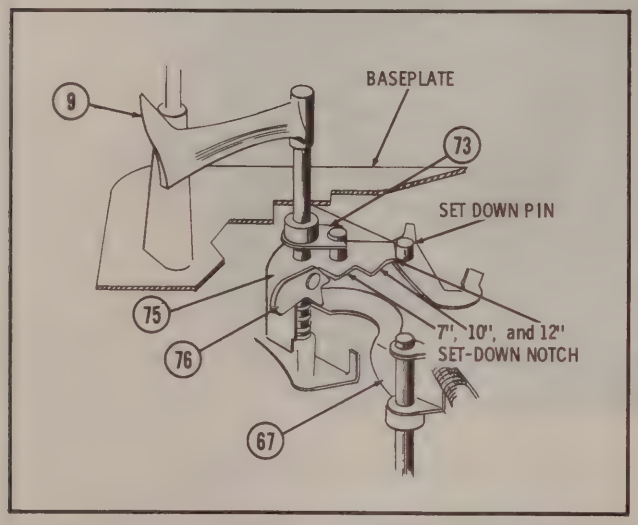
As main gear (28) starts its rotation, the stud on the end of raising lever (67) engages an eccentric groove in the underside of main cam (28). The motion imparted to the raising lever (67) by the eccentric groove causes the rear end of raising lever (67) to pivot upward and contact the lift plate (64). In turn, the lift plate friction pad (63) lifts the shutoff plate (61), which raises the tone arm off its rest. As the shutoff plate (61) is raised, it clears the microswitch plunger and permits the microswitch and switch bracket (50) to be returned to their original position by action of torsion spring (49).

As the shutoff plate (61) raises, the bottom tooth on the bottom of record selector bracket pawl (76) engages a hook on the raising lever (67), so that pawl (76) and record size bracket (75) will follow the motion of raising lever (67).

At this time, the eccentric groove in the bottom of main cam (28) causes the rear end of raising lever (67) to pivot. As a result, stop plate (61) and record size bracket (75) are simultaneously rotated counterclockwise. During this rotation, the set down pin (located on top of the shutoff plate) swings clear of the record size bracket (75) and the shutoff plate (61) follows the rotation of the raising lever (67). The record size bracket (75) follows along with the shutoff plate (61) until the bracket stop ear (75A) hits the tone arm bracket (47). Consequently, the raising lever (67) moves out from under the record selector pawl (76) and the record size bracket (75) is permitted to drop. This brings the notched plate, located on the top of record size bracket (75), directly in line with the set down pin which is located on top of shutoff plate (61). As a result, the inward swing of the tone

arm (toward the spindle) is stopped at the point where the set down pin contacts the notched plate. The exact position of the tone arm set down depends upon the particular record size bracket notch (75) engaged by the set down pin. This, in turn, is determined by the size of the bottom record on the spindle.

After the tone arm lands on the record and the mechanism reaches its out of cycle position, the velocity trip arm (60) moves inward toward the trip bracket (38) as the tone arm tracks toward the spindle. Near the end of the record the velocity trip arm (60) actually contacts the trip bracket (38), but velocity is insufficient to cause slide plate (34) to engage the turntable gear. When the tone arm follows the eccentric groove at the end of the record the movement of the velocity trip arm (60) increases and sufficient velocity for tripping action is applied to the slide plate (34).



Record Size Selection-

As the record size bracket (75) rotates at the beginning of the change cycle, the pin on top of bracket (75) rides within the fork of the semaphore link (73) and causes semaphore (9) to swing toward the spindle. When pawl (76) disengages from raising lever (67), the record size bracket (75) drops so that its 7 inch set down notch is in position to block the set down pin which is located on top of shutoff plate (61). When the tone arm has reached its farthest outward travel, the bottom record will be pushed off the spindle shelf. If the record has a 7 inch diameter, it will clear the semaphore (9) as it drops to the turntable, and the position of record size bracket (75) will not be changed. If, however, a 10 or 12 inch record drops off the spindle, it will hit against one of the sloping sides of the semaphore (9) and push it back toward its original position. A 10 inch record will push the semaphore back approximately half way, while a 12 inch record will push it back to its starting place. This motion is transmitted to the record size bracket (75) and positions it to block the tone arm for the 10 or 12 inch set down point.

Record Push Off Mechanism-

The record push-off mechanism consists of a pre-assembled spindle (6) and a spindle lever and roller (55). The roller rides on the cam surface on the bottom of the main cam (28). As the main cam rotates, the roller is depressed, causing the opposite end of the spindle lever to force the spindle mechanism upward. When the spindle mechanism has reached its maximum upward position, the bottom record of the stack is pushed off the spindle and drops to the turntable.

Shut Off Operation After Last Record Is Played-

After the last record drops to the turntable, the overarm shaft depresses the lockout lever (81). This causes the lockout pawl (80) to be lowered until, after the last record has dropped, the bottom edge of pawl (80) is in a position to engage with the protrusion on the rear of shutoff plate (61) and prevent any inward motion of the shutoff plate during the change cycle. As a result, the tone arm will set down on the tone arm rest, causing the shutoff plate (61) to depress the switch plunger and shut off the motor.

The action of the pivot bracket lever (69) prevents the automatic shut off operation before the last record has been played. While the last record of a stack is resting on the spindle shelf, the lock out lever (81) is held in a raised position by tension spring (82). As the changer goes into cycle, but before the last record is pushed from the spindle shelf, the pivot bracket lever (69) pivots under the lock out lever and prevents the weight of the overarm shaft from depressing lock out lever (81). After the last record has been played and the changer again goes into a change cycle, the weight of the overarm shaft depresses the lock out lever (81). In this position, the pivot bracket lever (69) pivots over the top of lock out lever (81) and permits the lock out pawl (80) to engage with the ear on shut off plate (61) and block the inward movement of the tone arm.

ADJUSTMENTS

Tone Arm Shaft Assembly Adjustment-

The entire operation of the changer mechanism depends, to a large degree, upon the correct assembly of the tone arm shaft parts. Improper adjustment of these parts will indicate false symptoms elsewhere in the changer (i.e. height adjustment, indexing adjustment, etc.) when actually the troubles are caused by incorrect adjustment of the tone arm shaft and its associated parts.

Of the various parts assembled on the tone arm shaft (26), only the stop plate (61) is actually fastened to the shaft, with a #8 Bristol screw (62). As a result, any up and down or lateral movement of the stop plate is transferred to the tone arm. All other parts fit the tone arm shaft loosely and are permitted to rotate freely about the shaft.

The position and height at which the stop plate (61) is fastened to the tone arm shaft is of the utmost importance. Improper positioning of this assembly could result in no motor shutoff, incorrect tone arm set down, tone arm slide on record, no tone arm set-down on rest, continuous cycling, or any combination of these.

To simplify the correct positioning of stop plate (61), a small indentation has been drilled into the tone arm shaft. It is imperative that the set screw of the stop plate engages this indentation and is securely tightened. With the stop plate so positioned, the occurance of any symptoms described above would be do to other causes.

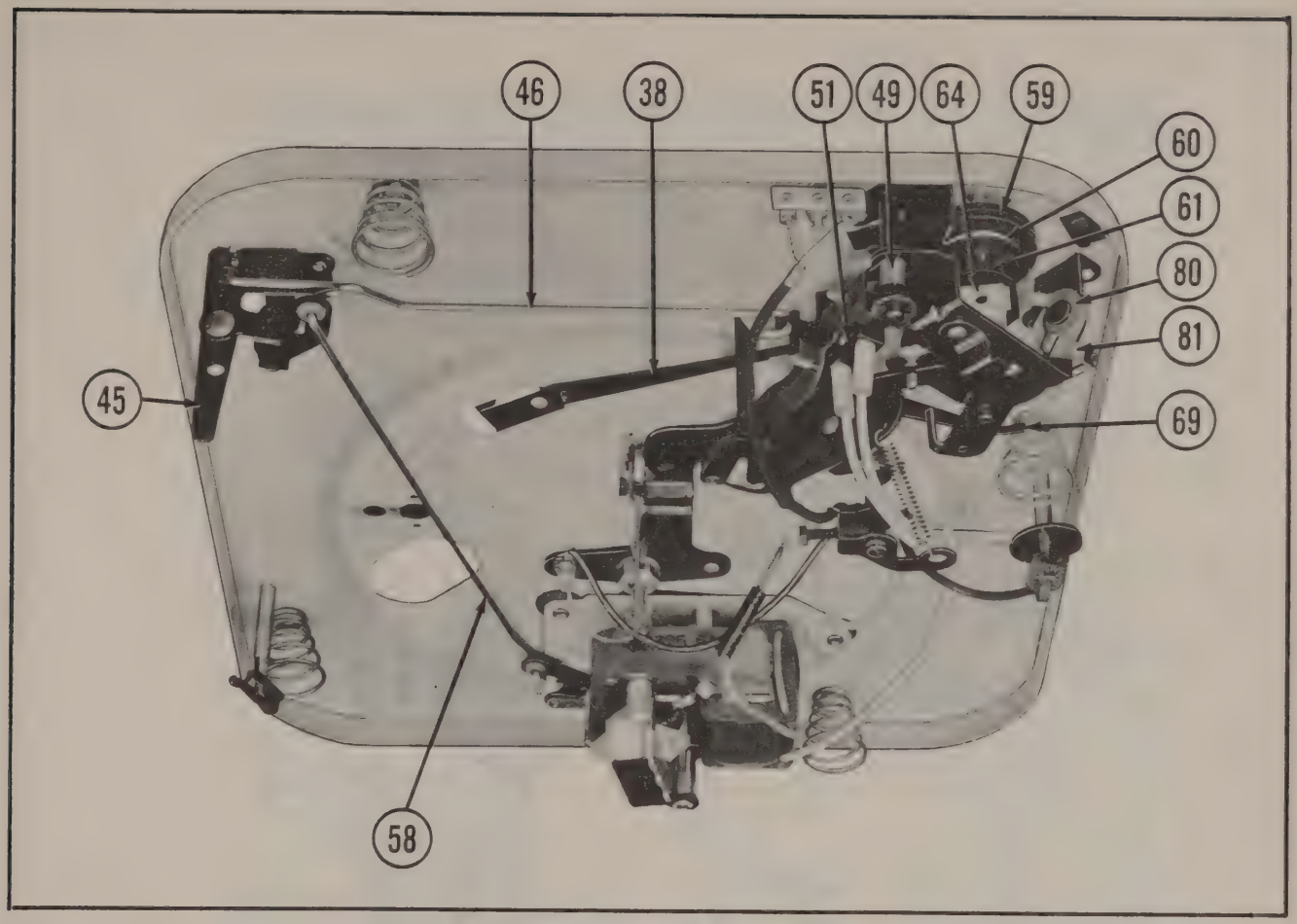


Figure 3

Tone Arm Set-Down Adjustment-

Tone arm set-down adjustment is required if indexing is correct (tone arm sets down in approximately the correct position for the record being played) but the needle does not land in the lead-in groove of the record. Adjustment is made by means of the set-down adjusting screw (20) which is located in the tone arm hinge assembly. Adjust as follows:

1. With reject knob in "N" position, place a 7-inch record or the turntable and depress the reject knob.

2. Rotate the turntable by hand and observe the needle landing point.

3. If needle tends to set down outside of record, turn adjusting screw (20) counterclockwise to move tone arm towards spindle. If needle sets down too far in on record, turn screw (20) clockwise until the correct set-down point is obtained.

Tone Arm Height Adjustment-

The tone arm height must be adjusted so that, at its maximum height during the change cycle, the needle will just clear a 1-inch stack of records resting on the turntable. Adjustment is made as follows:

1. Place reject knob in "N" position and load a 1-inch stack of records on the turntable.

2. Depress reject knob and rotate turntable by hand, to start change cycle.

3. If the tone arm is too low it will hit the outside rim of the record stack as it swings toward the spindle. If this occurs, insert a small screwdriver through the hole in the top rear portion of the tone arm and turn the height adjusting screw (16) in a clockwise direction. (Never turn the adjusting screw more than 2 turns clockwise or glide troubles may result).

4. If tone arm clears record stack by more than 1/8 inch, turn screw (16) counterclockwise to lower the arm.

NOTE: The above adjustment will have only a limited effect on the tone arm height. It can not compensate for an improperly adjusted stop plate (61), as described under "Tone Arm Shaft Assembly Adjustment". If the height adjustment does not have sufficient effect, check the tone arm assembly. If this is found to be correct, loosen set screw (70) in collar (71) and slide collar up or down on raising lever shaft until correct adjustment is obtained.

Stylus Pressure Adjustment-

Unless otherwise stated by the cartridge manufacturer, the stylus pressure should be between 8 and 11 grams for best results. Stylus pressure is adjusted by rotating the tone arm counterbalance stud (22). The stud can be rotated by inserting a small steel rod in the stud hole. Rotate the stud upward to decrease stylus pressure, or downward to increase stylus pressure.

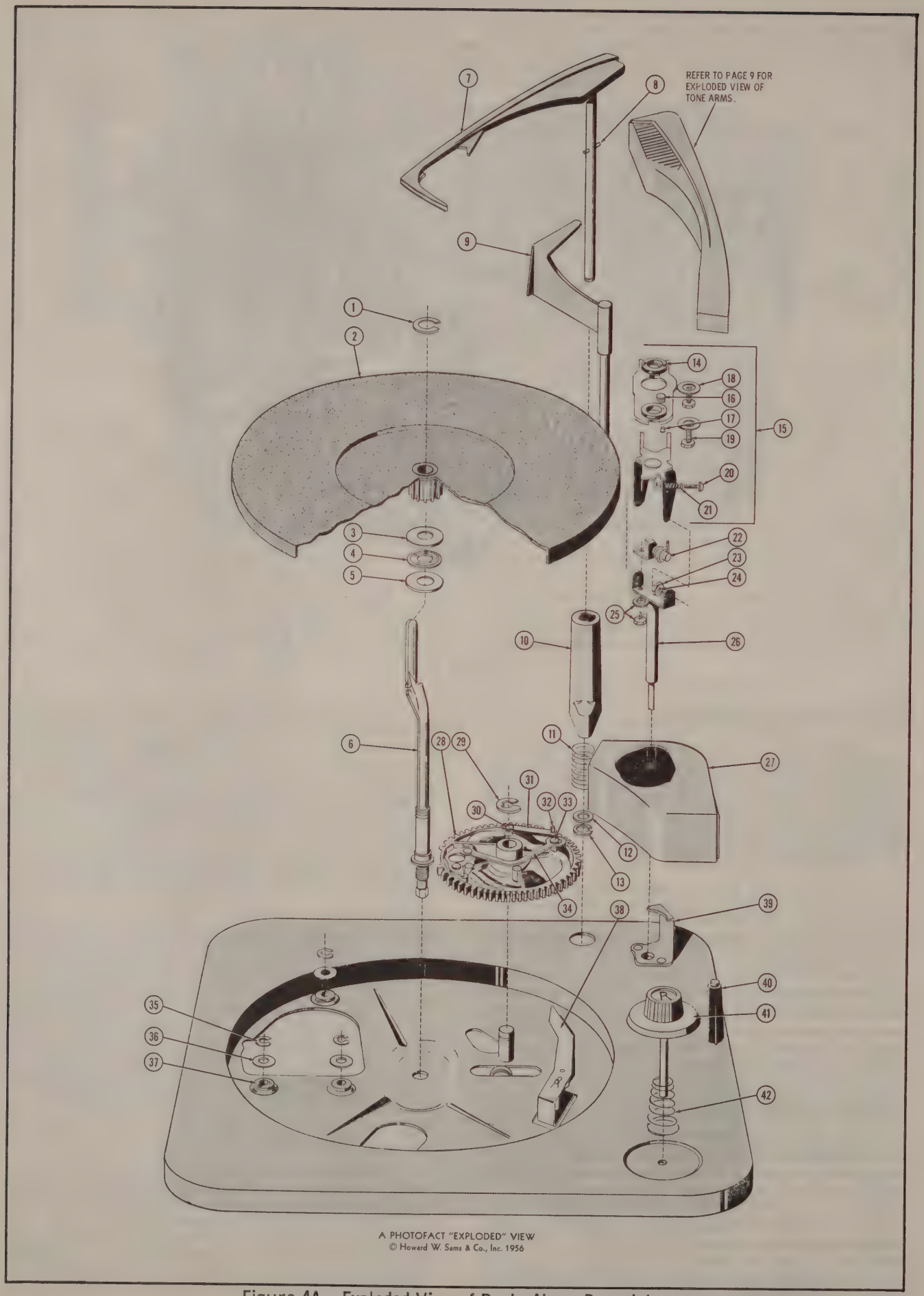


Figure 4A. Exploded View of Parts Above Baseplate.

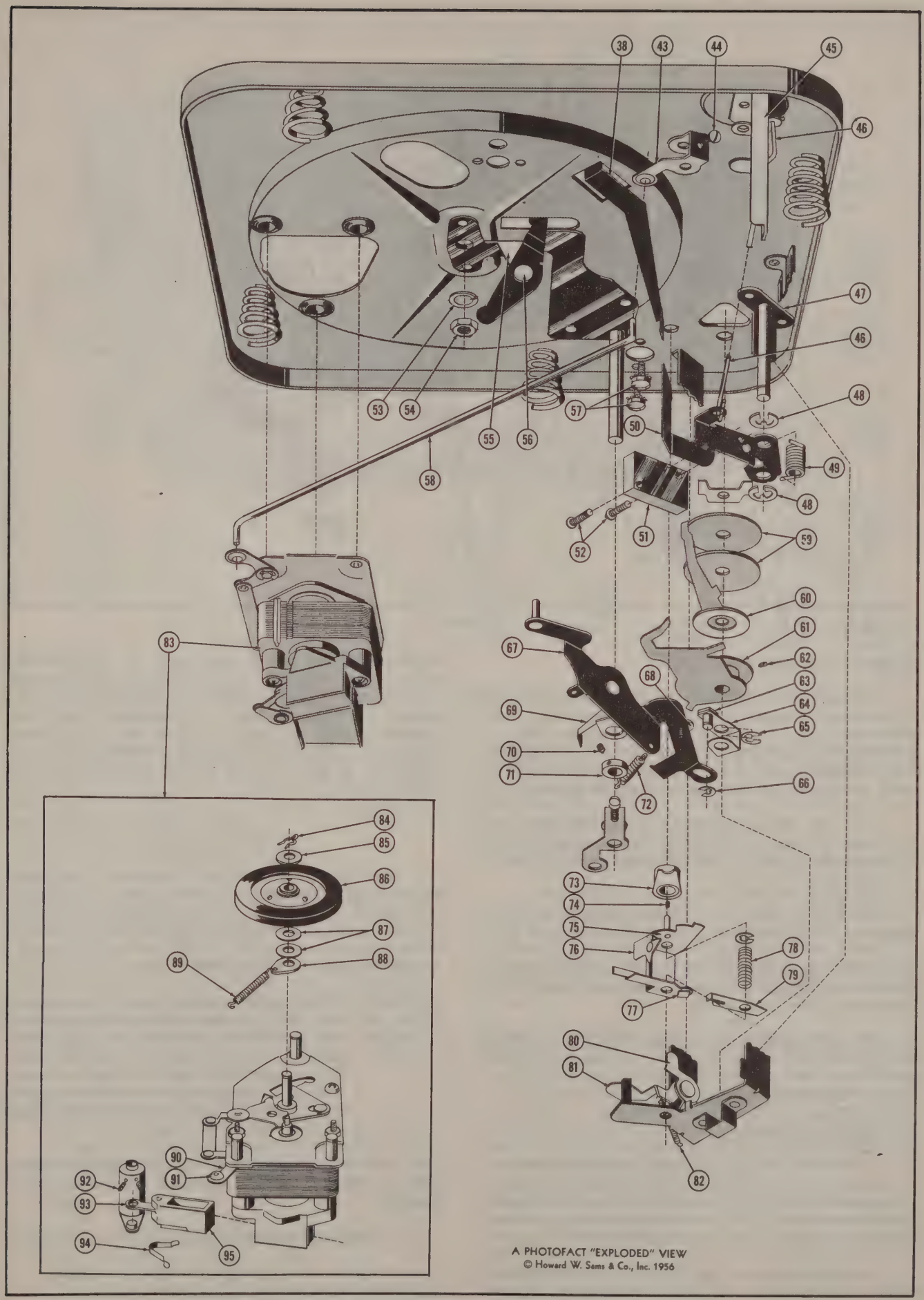


Figure 4B. Exploded View of Parts Below Baseplate.

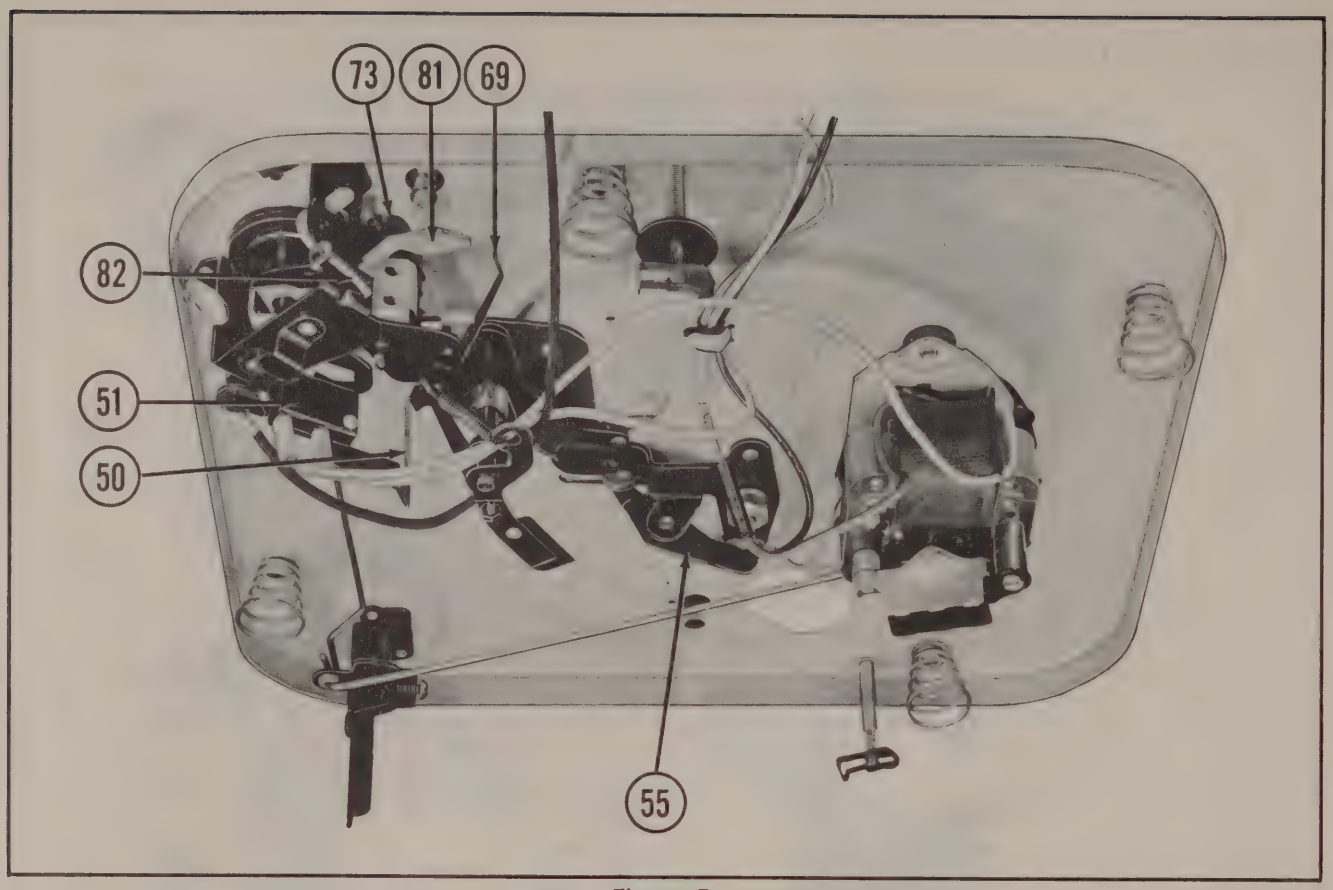


Figure 5

Semaphore Adjustment-

Adjustment of the semaphore (9) is required if it becomes necessary to replace the semaphore, if the semaphore link (73) has loosened during operation, or if erratic or improper indexing occurs. Adjustment involves positioning of the semaphore link (73) on the shaft so that proper semaphore action is possible.

The link (73) is fastened to the semaphore shaft by means of set screw (74) which is accessable from the back of the changer. Correct adjustment procedure is as follows:

1. Loosen set screw (74) and permit link (73) to drop until it rides on top of record size bracket (75).

2. With semaphore (9) held firmly against the overarm housing (10), rotate record size bracket (75) clockwise as far as possible.

3. Lift semaphore link (73) until it is raised to within 1/64 inch of the underside of the main plate, and tighten set screw (74) securely so that link is fastened to semaphore shaft.

Velocity Trip Adjustment-

Improper adjustment of the velocity trip mechanism may result in failure of the automatic or reject trip levers to initiate the change cycle, or could cause continuous cycling. To check this adjustment, or correct faulty adjustment, proceed as follows:

With tone arm on it's rest, remove turntable and move slide plate (34) away from spindle as far as possible. Rotate trip bracket (38) until its bottom portion contacts the reject trip lever (50). In this position, the clearance between the top portion of trip bracket (38) and the slide plate lever (34) should be approximately 1/8 inch. If spacing is incorrect, bend the flexible portion of switch bracket (50) until proper clearance is obtained. Check trip bracket (38) to make sure that it does not rub against the main cam or baseplate.

LUBRICATION

All Webcor changes are completely lubricated before leaving the factory. Under normal conditions, this should be sufficient for approximately one year or 1000 hours of operation. However, when operated under extreme conditions of dust or heat the mechanism should be lubricated more often.

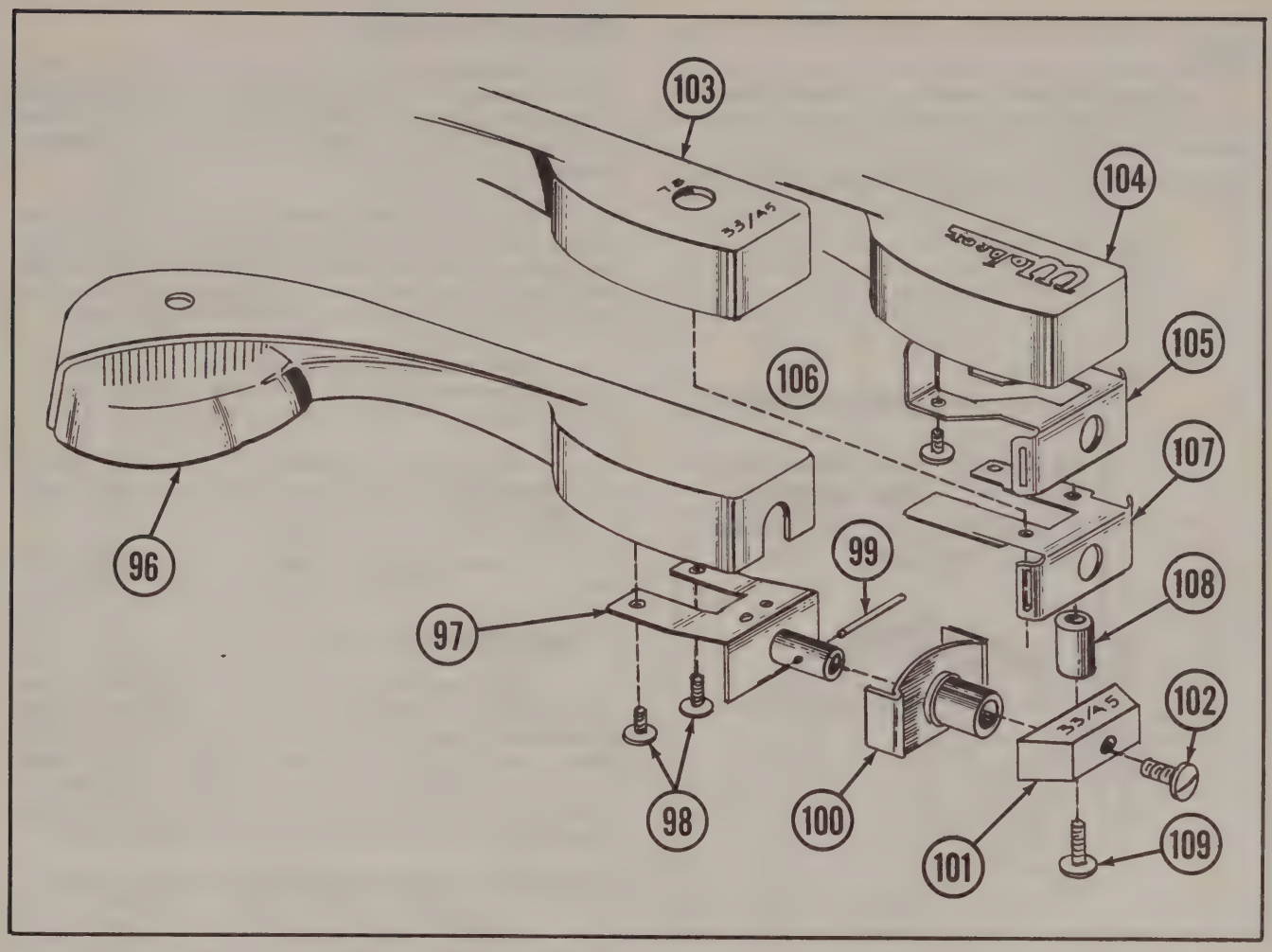
CAUTION: When lubricating the changer, do not permit oil or grease to come in contact with the idler wheel, motor drive shaft, turntable rim, slide plate lever (34), tone arm lockout lever (81), or lift plate friction pad (63). Any oil or grease on these parts will prevent proper operation and should be removed with alcohol.

The following parts should be lubricated with a light machine oil, using a small oil can or a medicine dropper:

1. Motor bearings (1 drop).

2. Main cam bearings (1 drop).

3. Overarm shaft (1 drop).



4. Turntable bearing race (1 drop).

The following part should be lubricated with a non-fluid high temperature lubricant. Lubricant may be applied with a small brush.

1. Main cam eccentric groove.

TROUBLES AND PROBABLE REMEDIES

No Sound Output From Changer-

Disconnect leads from cartridge lugs and check output directly at cartridge. If output is normal, trouble is in the wiring and can be located by checking continuity with an ohmmeter. If there is no output from cartridge, check to see that stylus is correctly installed and is riding in record grooves. If this is normal, replace the cartridge.

Sound Is Distorted-

Check stylus pressure with an accurate guage. If pressure is normal (between 8 and 11 grams) replace stylus. If output is still distorted, replace cartridge.

Motor Starts But Turntable Does Not Rotate-

Remove turntable to expose idler wheel assembly (86). Turn reject knob to "78" position and check position of idler wheel. Wheel should be pressing against motor drive shaft. If it does not, check tension of spring (89). If spring is tight, check idler wheel bracket for binding in the idler slot or rivet. Depress reject knob to start motor. Idler wheel should rotate freely. If it does not, remove wheel from its shaft and clean shaft and wheel bushing.

Motor Does Not Start When Reject Knob Is Depressed-

Manually lift tone arm from tone arm rest and swing it towards spindle. If motor does not start, observe switch action as reject knob is depressed. If switch is not pushed out from under stop plate (61), so that plunger is released, check tone arm assembly as described under "Tone Arm Shaft Assembly Adjustment".

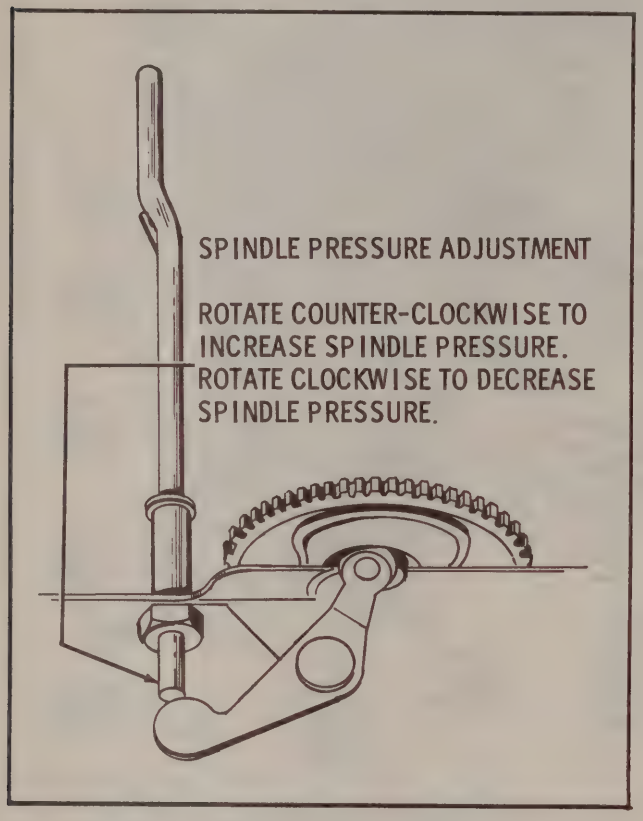
Change Cycle Does Not Start When Reject Knob Is Depressed-

Turn reject knob to "78" position. Check raising lever (67) to see that its guide pin is engaged in the eccentric groove in the bottom of main cam (28). Remove turntable and move slide plate (34) on main-cam to make sure that it moves freely.

Depress reject knob and observe action of trip bracket (38) and slide plate (34). The trip bracket should push the slide lever toward spindle and maintain pressure on slide lever so that it can not move back on its own accord. If this condition does not exist, check to see that trip bracket (38) is not binding on the baseplate. Check trip adjustment as described under "Velocity Trip Adjustment".

Record Drops On Tone Arm As Arm Moves Toward Spindle-

Increase spindle pressure by turning spindle adjusting nut (located on bottom of spindle) counter-clockwise.


SPINDLE PRESSURE ADJUSTMENT
ROTATE COUNTER-CLOCKWISE TO INCREASE SPINDLE PRESSURE.
ROTATE CLOCKWISE TO DECREASE SPINDLE PRESSURE.

Record Drops On Tone Arm As Arm Moves Away From Spindle-

Decrease spindle pressure by turning spindle adjusting nut clockwise.

Improper Or Erratic Tone Arm Set Down-

Check semaphore (9) for nicks or warpage. Replace if necessary. Check semaphore adjustment as described under "Semaphore Adjustment".

Slow Or Erratic Speeds-

Remove any dirt, oil of grease from the idler wheel, motor drive shaft and turntable rim with alcohol. Check idler wheel for a smooth shiny surface. If this condition exists it can cause slippage. If necessary, replace idler wheel.

Check idler wheel position against motor drive shaft. If wheel is tilted so that only the edge is pressing against the drive shaft, the idler wheel stud may be bent, and should be straightened so that entire surface of idler wheel rim contacts the drive shaft.

Place the reject knob in "N" and turn the turntable by hand to see if the turntable turns easily. If not, clean the turntable bearings and re-lubricate.

Rotate the motor shaft by hand to see if the motor bearings bind. If so, lubricate as described under "Lubrication".

If none of the above conditions exist, replace the motor.

Changer Stalls During Cycle-

Check line voltage. Voltage should be no less than 105 volts. Remove turntable and clean idler wheel and inner turntable rim with alcohol. If idler wheel has a worn surface, it should be replaced. Rotate main cam (28), by hand, in a clockwise direction. If cam will not rotate completely without undue force being applied, check for binding in the mechanism.

Creaking Or Groaning Noise During Change Cycle-

If lift plate friction pad (63) is rough it will cause excessive friction between the pad and stop plate (61). Rub with wax crayon that portion of stop plate (61) which comes into contact with pad (63). Smooth operation will result after following this procedure.

With Records On Spindle, Tone Arm Sets Down On Rest-

Replace defective or missing lockout tension spring (83). If lockout lever (81) does not pivot about its rivet, clean with alcohol. If changer still does not operate satisfactorily, check the tone arm assembly as described under "Tone Arm Shaft Assembly Adjustment".

PARTS LIST

Ref. No.	Part No.	Description
1	50P348	Turntable Clip
2	11X1323	Turntable (specify color)
3	25P624	Bearing Race Washer
4	11X058	Turntable Bearing Race
5	25P269	Bearing Race Washer
6	11X1404	Spindle
7	11X1391	Overarm
8	41P1450	Pin, Overarm Mounting
9	49P251	Semaphore (specify color)
10	42P368-1	Overarm Housing (specify color)
11	46P417	Spring
12	25P648	Washer
13	50P244	"C" Clip
14	25P558	Grommet, Hinge Mounting
15	21X331	Tone Arm Hinge Ass'y. (Includes items 14, 16, 17, 18, 19, 20, and 21)
16	11X1393	Height Adjusting Screw
17	25P639	Height Screw Insert
18	25P257	Washer, Tone Arm Mounting
19	26P965	Screw, Tone Arm Mounting
20	26P1246	Set Down Adjustment Screw
21	46P229	Compression Spring
22	21X335	Tone Arm Counterbalance
23	26P1267	Hex. Nut, Pivot Screw Adjustment
24	26P1267	Pivot Screw
25	26P1253	Screw, Tone Arm Shaft
26	21X359	Tone Arm Shaft
27	49P228	Tone Arm Housing (specify color)
28	11X1297	Main Cam
29	50P253	"C" Washer
30	26P1373	Drive Screw Main Cam
31	45P1880	Detent Spring, Main Cam
32	41P1428	Plunger, Main Cam
33	27P320	Shoulder Pin, Main Cam
34	11X1291	Slide Plate & Lever, Main Cam
35	25P535	"C" Clip, Motor Mounting
36	25P394	Washer, Motor Mounting
37	25P635	Grommet, Motor Mounting
38	11X1398	Trip Bracket
39	45P1429	Lift Stop Bracket
40	11X923	Tone Arm Rest, complete
41	49P226	Reject Button (specify color)
42	46P383	Spring, Reject Button
43	11X1375	Selector Link and Grommet
44	26P1422	Screw
45	11X1294-1	Reject Bracket
46	45P1902	Reject Rod
47	11X1299	Tone Arm Bracket
48	25P574	"C" Washer
49	46P392	Torsion Spring
50	11X1296	Switch Bracket
51	32X104	A.C. Switch
52	26P1420	Screw, Switch Mounting
53	25P352	Lockwasher, Spingle Mounting
54	26P1381	Nut, Spindle Mounting
55	11X1285	Spindle Lever and Roller
56	27P102	Rivet
57	26P1031	Screw, Overarm Post Mounting
58	45P1901	Speed Change Rod
59	45P1862	Tone Arm Weight
60	11X1295	Velocity Trip Arm
61	11X1379	Plate and Set Screw
62	26P695	Set Screw
63	28P014	Friction Pad, Lift Plate
64	11X1288	Lift Plate and Pad
65	25P447	"C" Clip
66	25P596	"C" Washer
67	11X1303	Raising Lever
69	45P1871	Pivot Bracket
70	26P676	Set Screw
71	41P557	Collar
72	46P397	Tension Spring
73	11X1376	Link and Screw
74	26P695	Screw
75	11X1304	Record Size Bracket (Includes items 76 and 77)
76	45P1887	Pawl Record Selector Bracket
77	28P014	Friction Pad Lift Plate
78	46P403	Spring
79	45P1992	Semaphore Latch
80	45P1872	Lock Out Pawl
81	45P1875	Lock Out Lever
82	46P357	Tension Spring
83	15X201	Motor - complete
84	50P125	Retainer Clip
85	25P430	Washer
86	11X1201	Idler Wheel
87	25P430	Washer
88	61P382	Spring Carrier
89	46P382	Tension Spring
90	17X618-1	Cam and Crank
91	25P621	Grommet
92	26P1353	Set Screw
93	45P1808	Linkage Arm
94	45P1804	Detent Spring
95	49P219	Nylon Cam
96	42P300-9	Tone Arm
	11X915	Cartridge Mounting Bracket (Includes Items 97, 98, 99, 100, 101, and 102)
97	11X912	Cartridge Mounting Bracket
98	26P474	Cartridge Mounting Screws
99	27P276	Groove Pin
100	11X907	Hub and Mounting Plate
101	49P176	Cartridge Knob
102	26P1250	Screw, Cartridge Knob
103	42P300-2	Tone Arm, G.E.
104	42P300-6	Standard Tone Arm — specify color
105	45P1980	Cartridge Mounting Bracket
106	26P840	Screw, Standard Cartridge Mtg.
107	45P1523	G.E. Cartridge Mtg. Bracket
108	41P1242	Spacer - G.E. Cartridge Mtg.
109	26P735	G.E. Cartridge Mtg. Screw

PHOTOFACT* Folder

RETMA MEMBER

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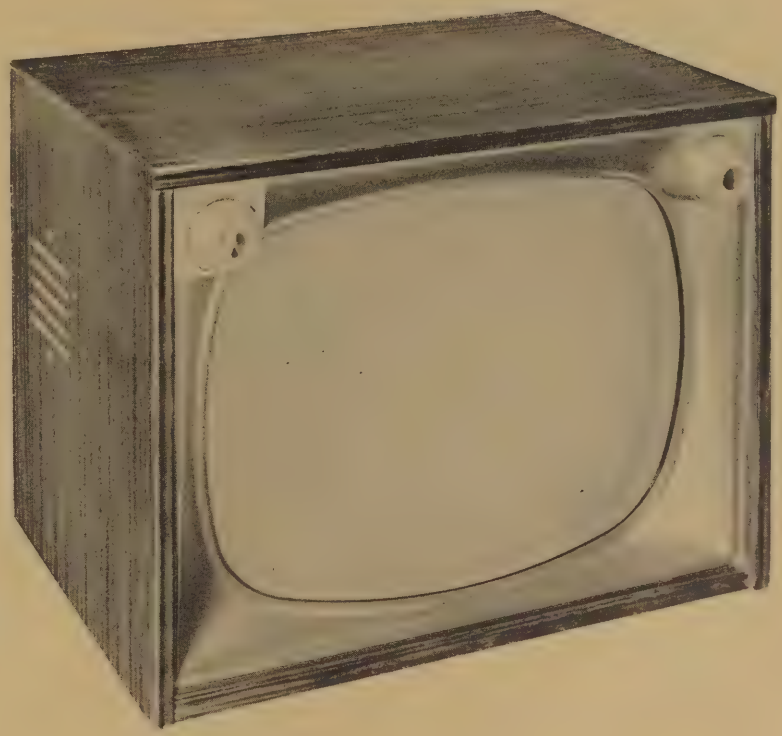

WELLS-GARDNER MODELS 321A59C (or CT, U, UT) -A-504, 321A59C (or CT, U, UT) -A-554, 324A59C (or CT, U, UT) -A-576, 2321A59C (or CT, U, UT) -A-508, 2321A59C (or CT, U, UT) -A-556, 2324A59C (or CT, U, UT) -A-560

WELLS-GARDNER MODEL 321A59CT-A-554

TRADE NAME	Wells-Gardner	MODELS 321A59C-A-504, 321A59CT-A-504, 321A59U-A-504, 321A59UT-A-504, 321A59C-A-554, 321A59CT-A-554, 321A59U-A-554, 321A59UT-A-554, 324A59C-A-576, 324A59CT-A-576, 324A59U-A-576, 324A59UT-A-576, 2321A59C-A-508, 2321A59CT-A-508, 2321A59U-A-508, 2321A59UT-A-508, 2321A59C-A-556, 2321A59CT-A-556, 2321A59U-A-556, 2321A59UT-A-556, 2324A59C-A-560, 2324A59CT-A-560, 2324A59U-A-560, 2324A59UT-A-560
MANUFACTURER	Wells-Gardner Co., 2701 N. Kildare Ave., Chicago 39, Illinois	
TYPE SET	Television Receiver	
TUBES	Sixteen	
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 1.38 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

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OF
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DRADO

DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.
2. Remove 2 metal screws holding upper left trim plate.
3. Remove 3 small knobs.
4. Remove 5 wood screws and 1 metal screw. Remove rear cover.
5. Disconnect speaker leads.
6. Remove 2 wood screws holding rear cabinet braces at the top.
7. Remove 6 cabinet bolts. Lift cabinet up and off.
8. Remove 2 speaker nuts. Remove speaker.

Model
321A59CT-A-554

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SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs and 2 metal screws holding trim plate, adjustments are accessible, one at a time, thru the small hole in the cabinet to the right and below the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 7 push-on type control knobs from front panel of cabinet. Remove 4 metal screws holding 2 trim plates. Remove trim plates. Tilt safety glass forward and lift out. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to the set. Adjustment is located on the tube side of the chassis. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (L23) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to the chassis. Adjust the buzz control (R7) for maximum volume and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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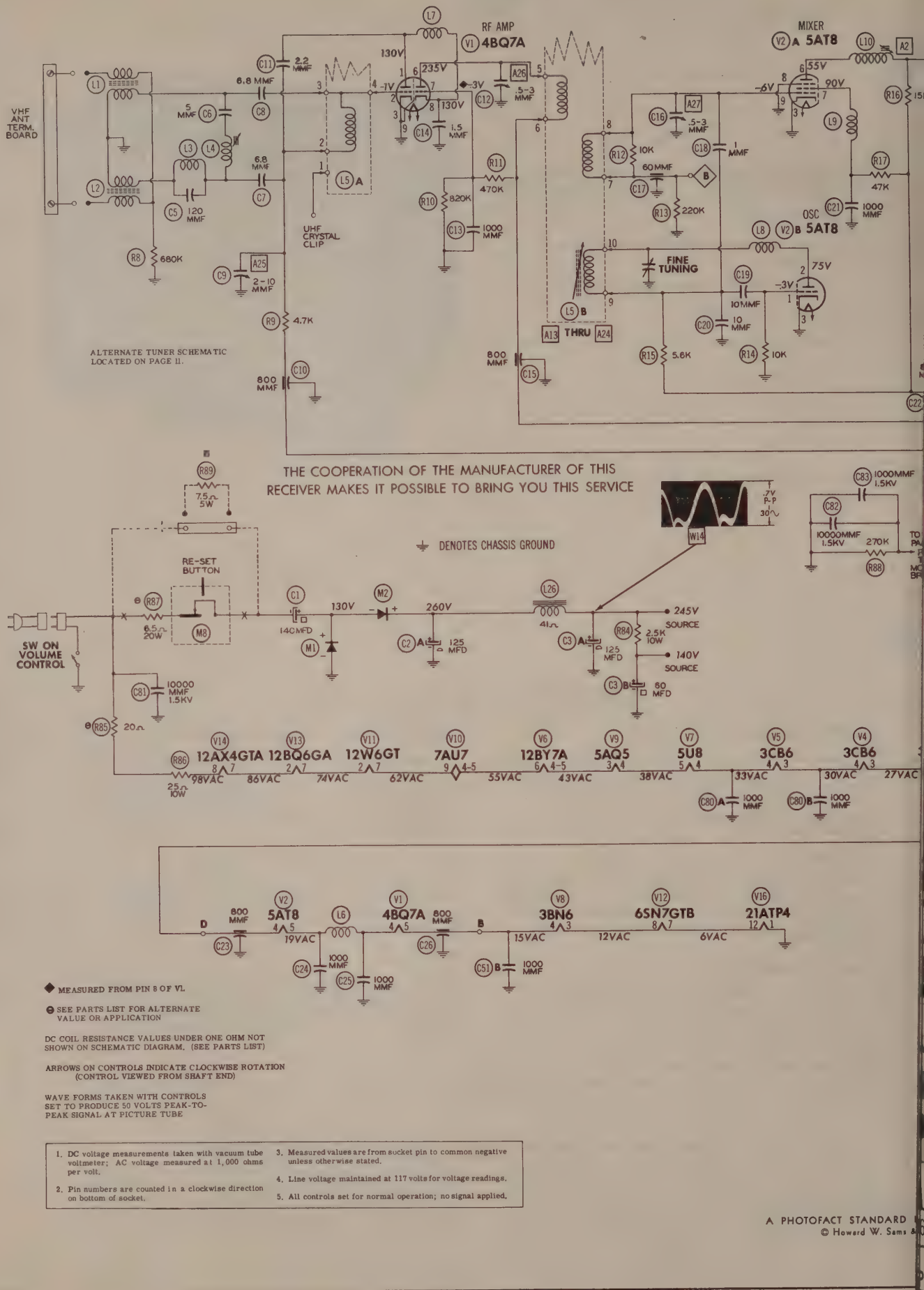

◆ MEASURED FROM PIN 8 OF V1.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

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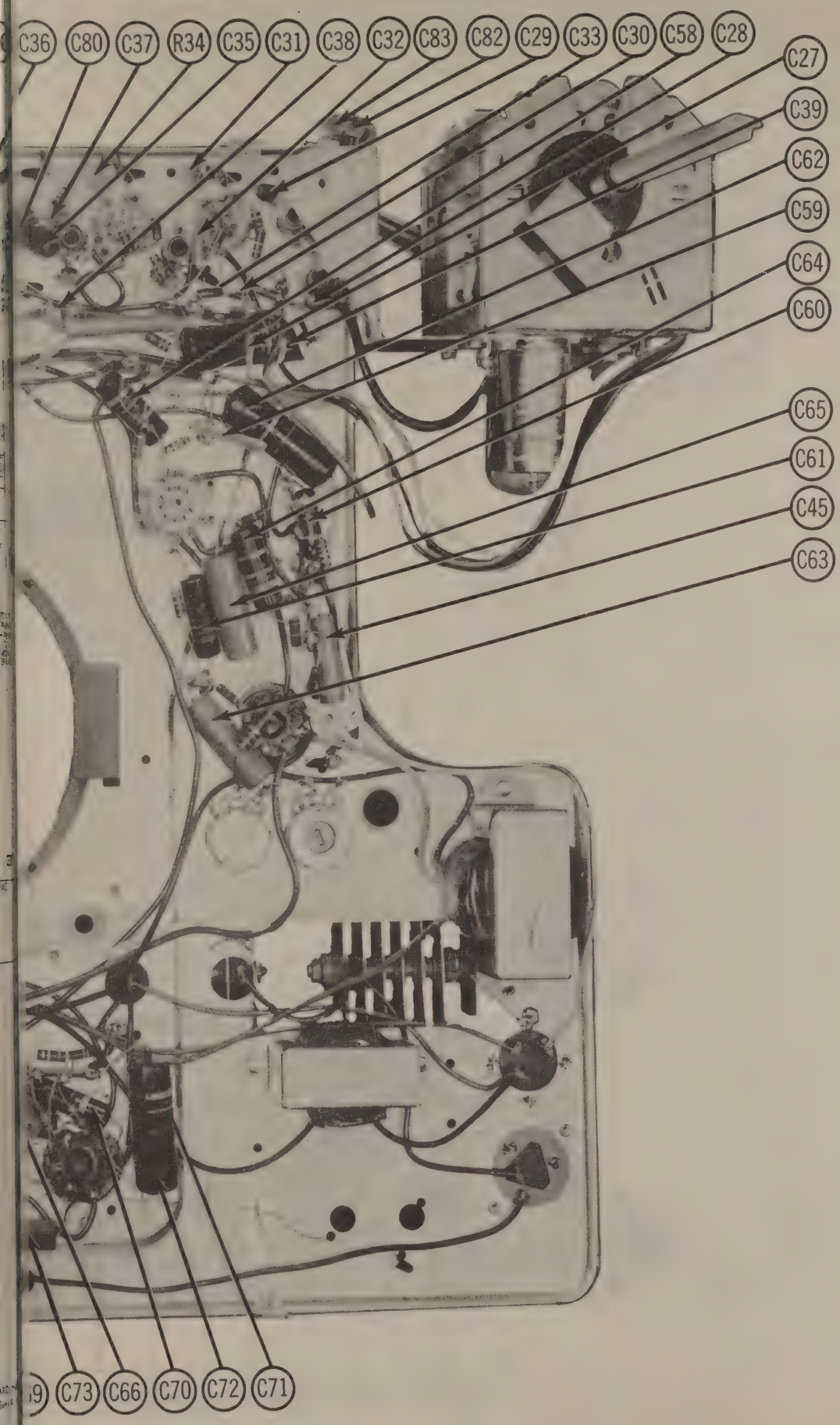
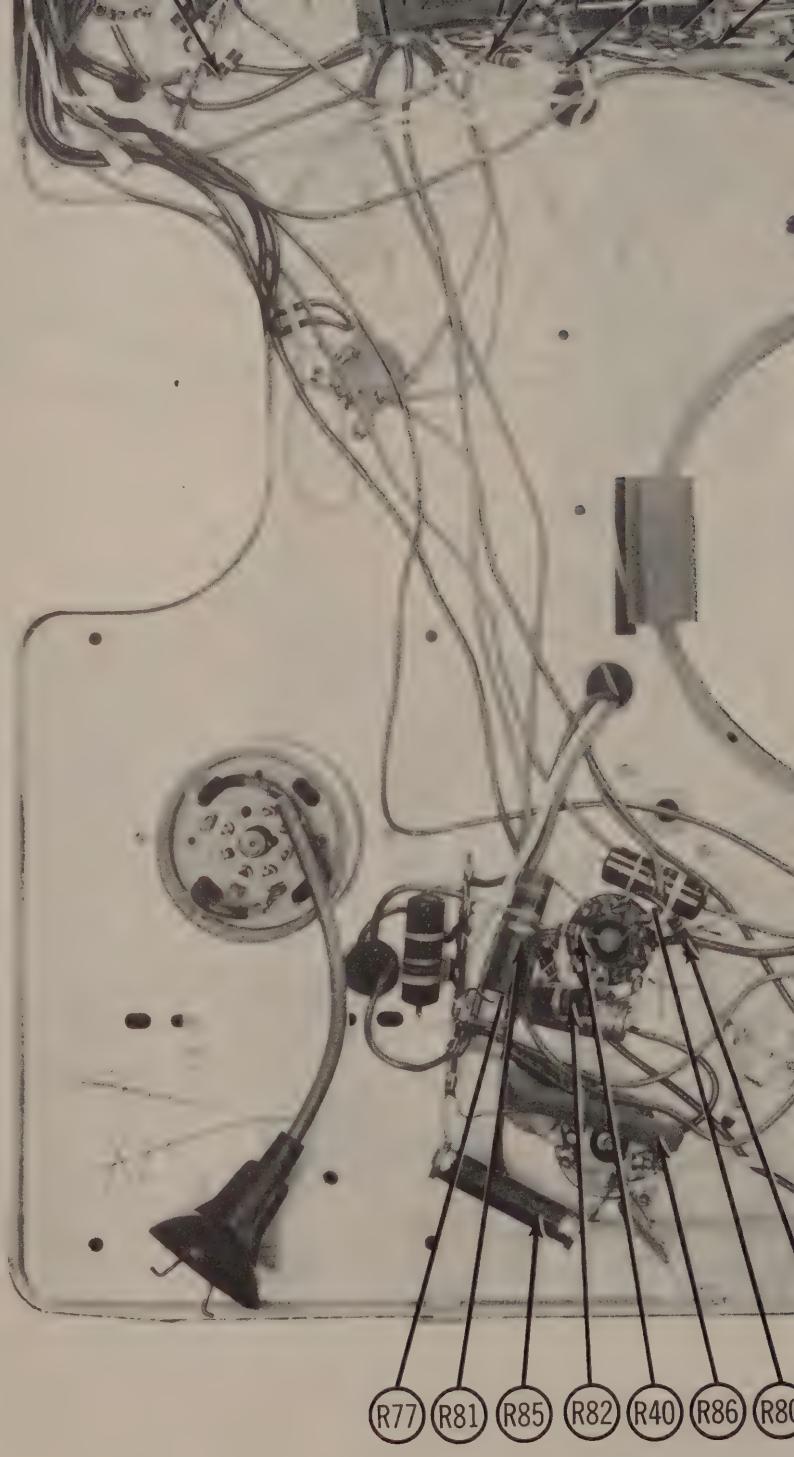


ACITOR IDENTIFICATION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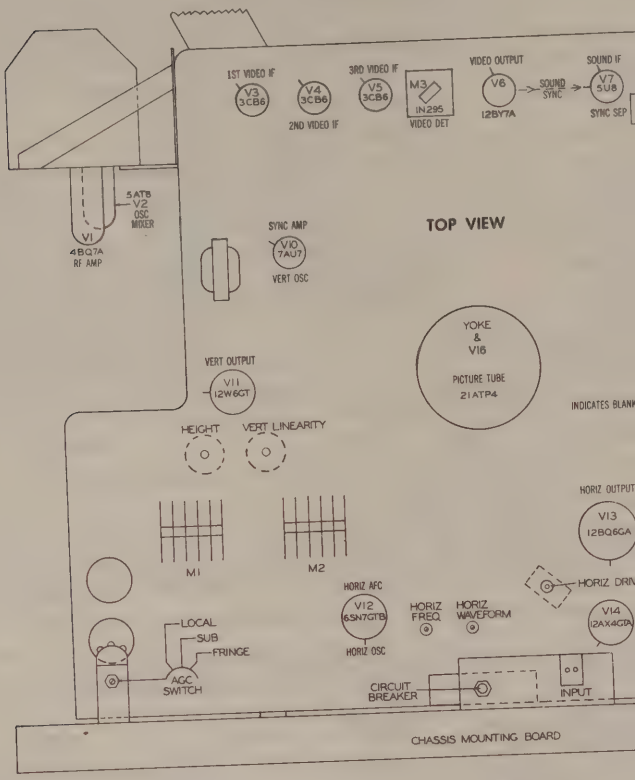


TUBE FAILURE CHECK C

The following chart lists tubes whose failures are most likely to pro
Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V16**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V10**
No horiz. sync - **V10, V12**
No vert. or horiz. sync - **V7, V10**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V16**

45.75MC 47.25MC					Step 1.

4.5MC TRAP ALIGNMENT

SIGNAL NERATOR EQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5MC mod)	Any	DC probe to pin 11, (cathode) of picture tube. Common to chassis.	A9	Adjust for MINIMUM deflection.

SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

V signal. Turn the buzz control (R7) 90 degrees from maximum clockwise rotation. Adjust A10 for strength. (Remove the antenna from the antenna terminals and stray feed the signal by placing the an-

e. Adjust R7 for minimum noise. Reconnect antenna and readjust A10 for maximum volume. If k can be heard.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

ge from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. vel.

SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.5MC (400% Mod) (50KC Swp)	4.5MC	Any non-interfering channel	Across secondary of T5.	A10	Set buzz control (R7) 90 degrees from maximum clockwise rotation. Adjust A10 for maximum 400% indication on scope.
"	"	"	"	A12, A11	Attenuate generator output so that signal is below limiting level of 3BN6 as evidenced by background hiss and noise. Adjust A12 and A11 for maximum 400% indication on scope.
"	4.5MC (400% Mod)	"	"	R7	Use a high generator output and adjust R7 for MINIMUM 400% indication on scope.
"	4.5MC	"	"	A10	With volume control at low level, retouch A10 for maximum 400% indication on scope.

VHF OSCILLATOR ALIGNMENT

olt bias supply to the ungrounded side of C33. Connect the positive lead to chassis. d-position of its range.

SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A13	Adjust to place sound marker in trap notc as in Fig. 4. Video marker should be at 50
207MC (10MC Swp)	205.25MC 209.75MC	12		A14	
201MC (10MC Swp)	199.25MC 203.75MC	11		A15	
195MC (10MC Swp)	193.25MC 197.75MC	10		A16	
189MC (10MC Swp)	187.25MC 191.75MC	9		A17	
183MC (10MC Swp)	181.25MC 185.75MC	8		A18	
177MC (10MC Swp)	175.25MC 179.75MC	7		A19	
85MC (10MC Swp)	83.25MC 87.75MC	6		A20	
79MC (10MC Swp)	77.25MC 81.75MC	5		A21	
69MC (10MC Swp)	67.25MC 71.75MC	4		A22	
63MC (10MC Swp)	61.25MC 65.75MC	3		A23	
57MC (10MC Swp)	55.25MC 59.75MC	2		A24	

ALIGNMENT INSTRUCTIONS (cont)

VHF RF AND MIXER ALIGNMENT

Connect bias as under "VHF Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A25, A26, A27	Adjust for response similar to Fig. 5.
14.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 5. If markers fall below 70% on any channel make SLIGHT compromise adjustment of A25, A26 and A27 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

UHF TUNER ALIGNMENT

The UHF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of the UHF portion of this set is not recommended in the field.

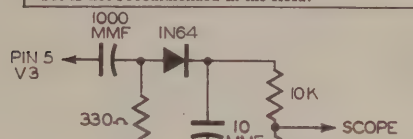


FIG.1

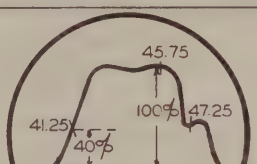


FIG.2

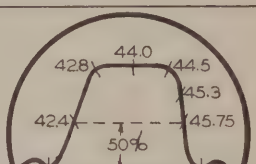


FIG.3

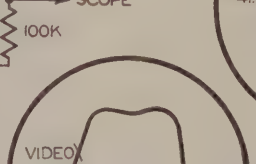
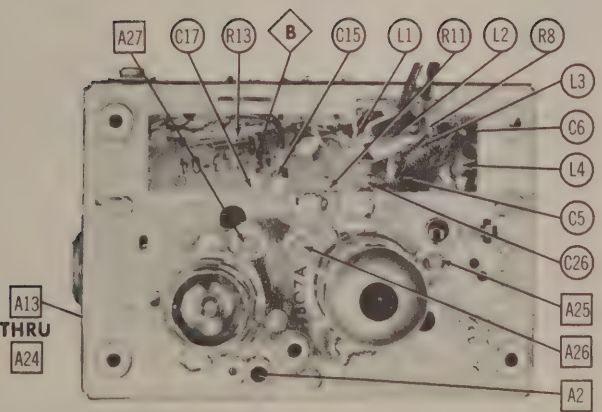
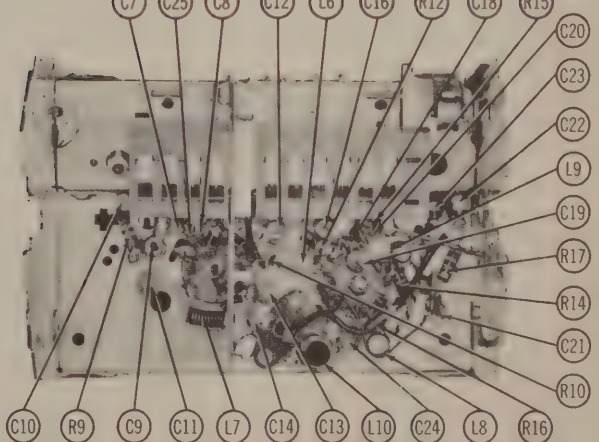


FIG.4

FIG.5



RF TUNER TOP VIEW

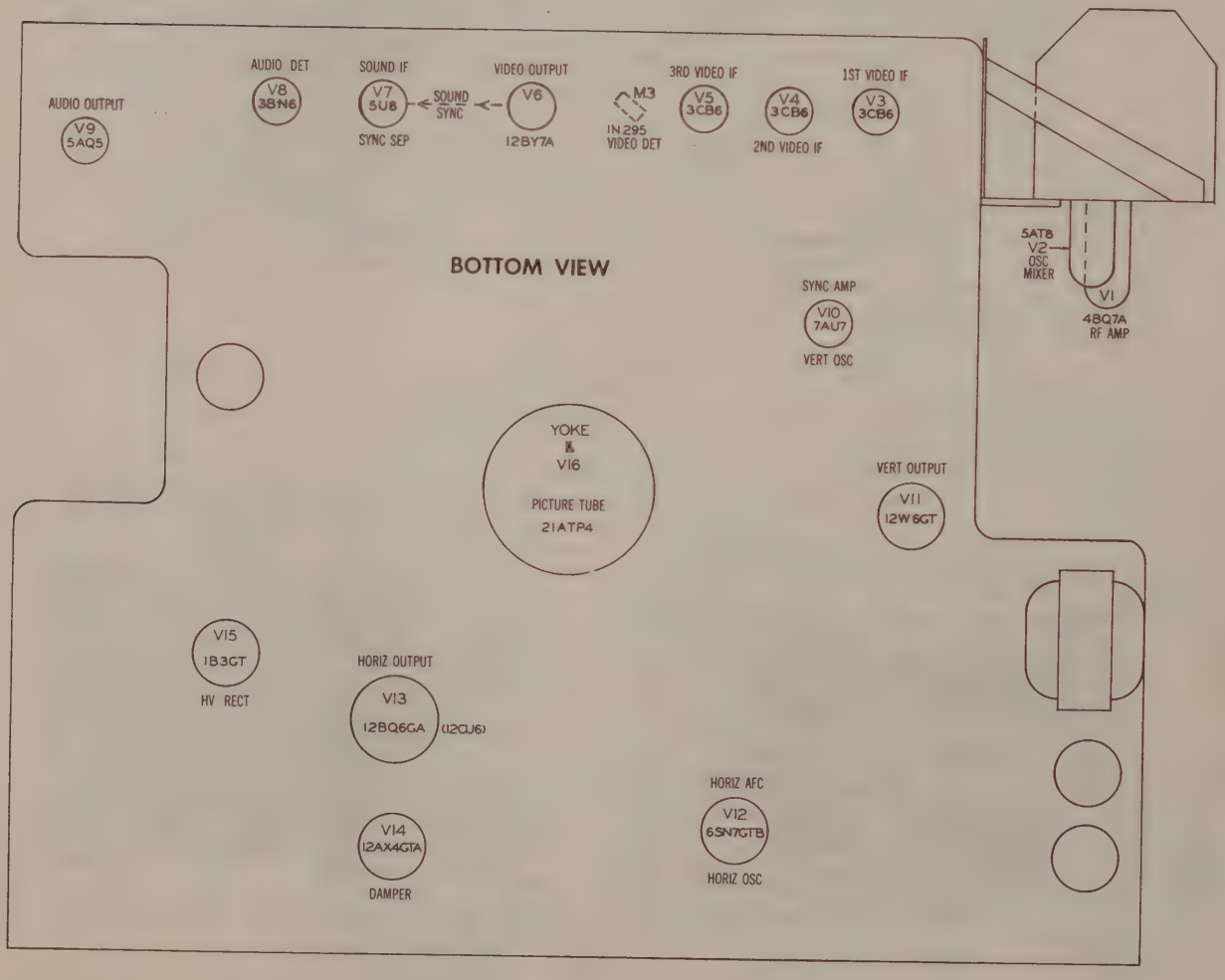


RF TUNER BOTTOM VIEW

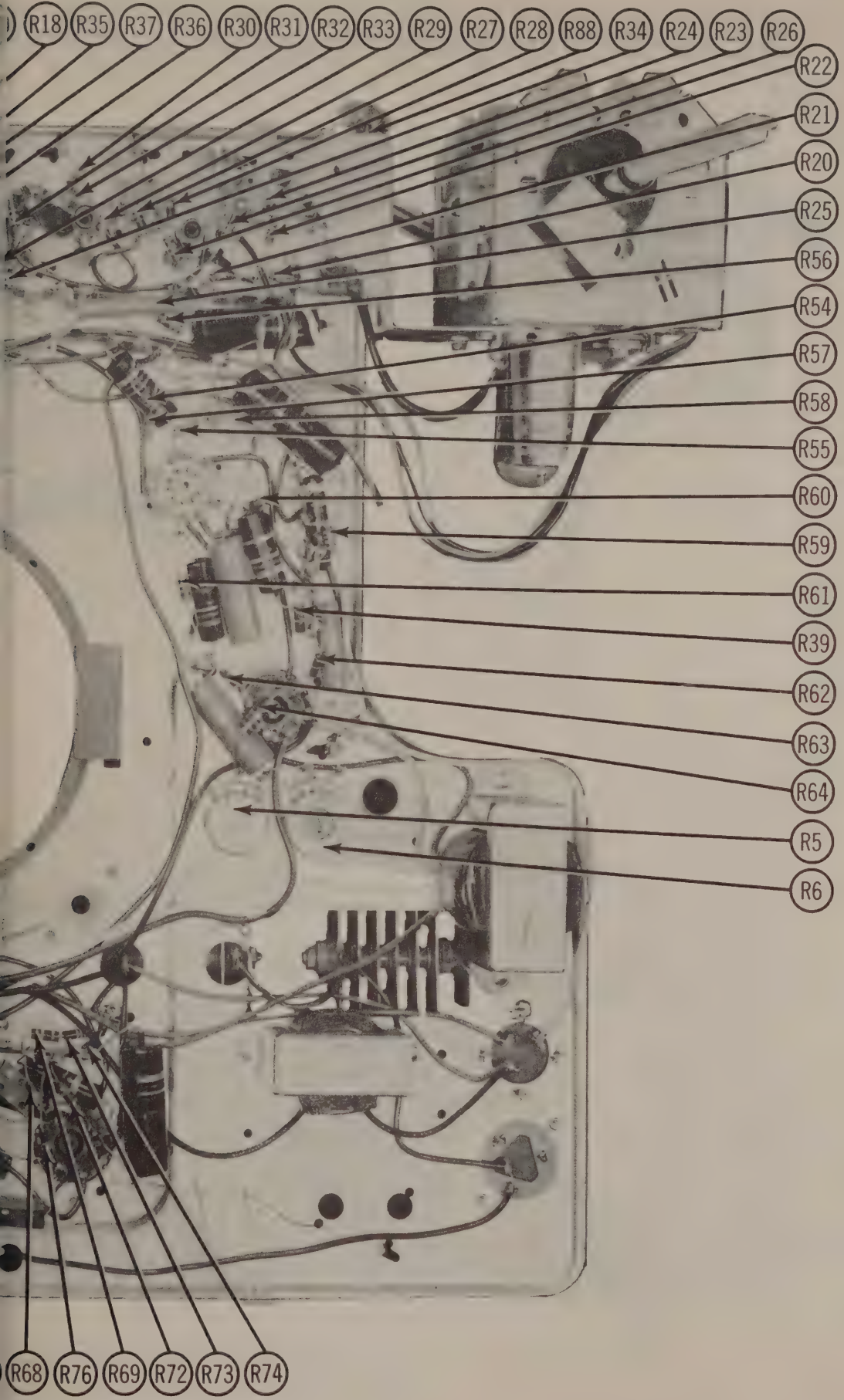
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	4BQ7A	INF	3Meg	0Ω	5Ω	4Ω	† 1KΩ	300KΩ	INF	0Ω
V 2	5AT8	10KΩ	† 8. 1KΩ	0Ω	6Ω	5Ω	† 18KΩ	† 50KΩ	0Ω	220KΩ
V 3	3CB6	1Meg	47Ω	6Ω	7Ω	† 5. 5KΩ	† 5. 5KΩ	0Ω		
V 4	3CB6	1Meg	47Ω	7Ω	8Ω	† 5. 5KΩ	† 5. 5KΩ	0Ω		
V 5	3CB6	. 2Ω	180Ω	8Ω	9Ω	† 3KΩ	† 3KΩ	0Ω		
V 6	12BY7A	260Ω	1Meg	0Ω	11Ω	11Ω	12Ω	† 3. 6KΩ	† 2. 5KΩ	0Ω
V 7	5U8	† 820KΩ	100KΩ	† 150KΩ	9Ω	10Ω	† 85KΩ	0Ω	0Ω	2. 2Meg
V 8	3BN6	250Ω	3. 6Ω	3Ω	4Ω	† 7. 2KΩ	5. 8Ω	† 330KΩ		
V 9	5AQ5	50KΩ	330Ω	11Ω	10Ω	† 900Ω	† 550Ω	50KΩ		
V 10	7AU7	▲ 2. 5Meg	1Meg	220Ω	12Ω	12Ω	† 14KΩ	47KΩ	0Ω	13Ω
V 11	12W6GT	TP	15Ω	† 450Ω	† 450Ω	2. 2Meg	NC	13Ω	1. 2KΩ	
V 12	6SN7GTB	430KΩ	† 56KΩ	0Ω	1. 4Meg	† 40KΩ	400KΩ	2Ω	3Ω	
V 13	12BQ6GA	NC	17Ω	TP	† 10 KΩ	470KΩ	TP	15Ω	100Ω	TOP CAP ▲ 10Ω
V 14	12AX4GTA	TP	NC	1Meg	NC	† 41Ω	NC	17Ω	20Ω	
V 15	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 320Ω
V 16	21ATP4	0Ω	25KΩ	PIN 6 † 100KΩ	PIN 10 ▲ 470KΩ	PIN 11 † 300KΩ	PIN 12 2Ω			

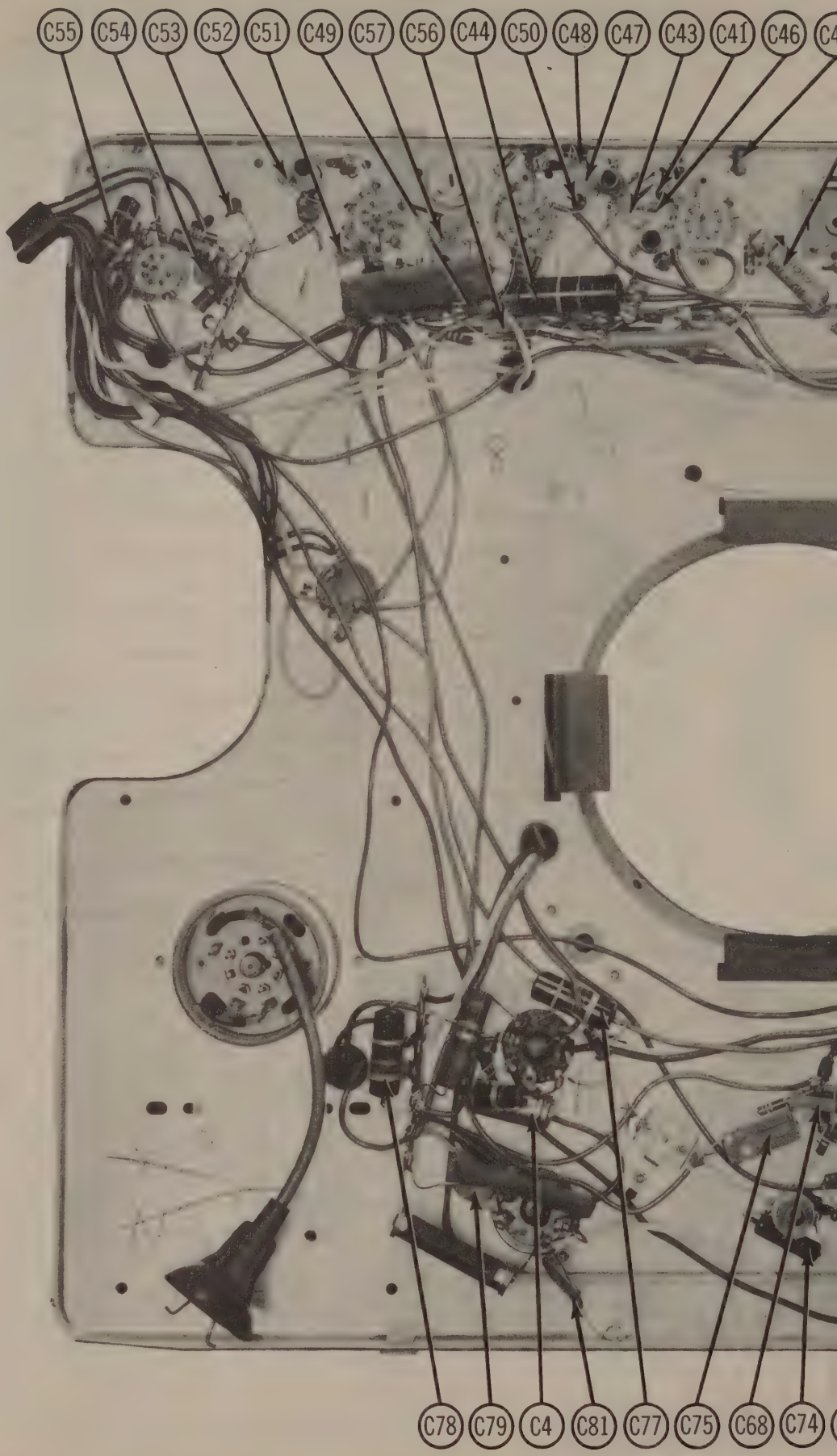
† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V14.
TP-TIE POINT.
NC-NO CONNECTION.



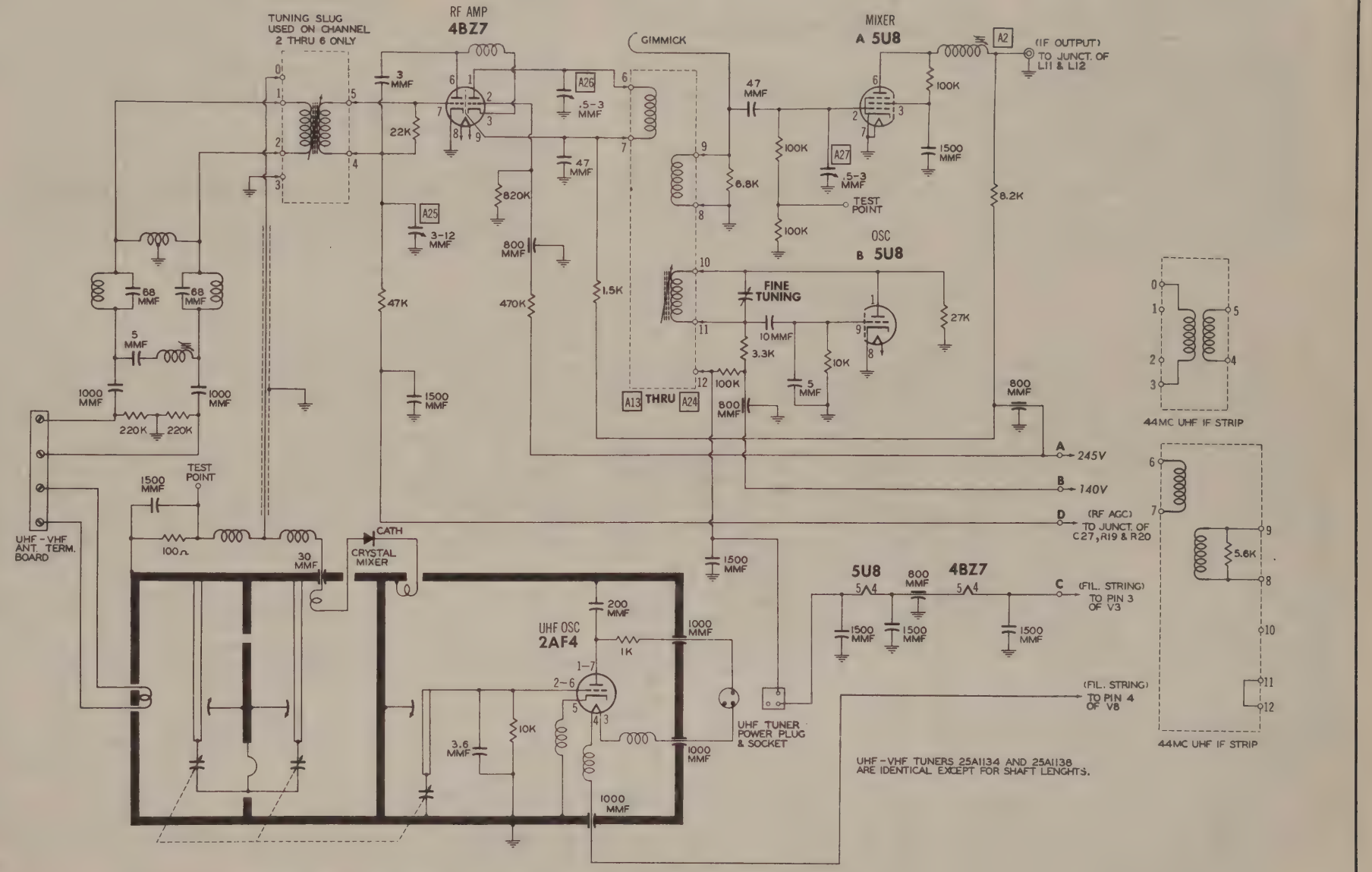
TUBE PLACEMENT CHART



ISTOR IDENTIFICATION



CHASSIS BOTTOM VIEW



UHF - VHF TUNER 25A1134 AND 25A1138 USED WITH UHF MODELS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE UHF-VHF TUNER SCHEMATIC

WELLS-GARDNER MODELS 321A59C (or CT, U, UT) -A-504, 321A59C (or CT, U, UT) -A-554, 324A59C (or CT, U, UT) -A-576, 2321A59C (or CT, U, UT) -A-508, 2321A59C (or CT, U, UT) -A-556, 2324A59C (or CT, U, UT) -A-560

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: Wells-Gardner PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	4BQ7A	4BQ7A	
V2	Mixer-Osc.	5AT8	5AT8	
V3	1st. Video IF Amplifier	3CB6	3CB6	
V4	2nd. Video IF Amplifier	3CB6	3CB6	
V5	3rd. Video IF Amplifier	3CB6	3CB6	
V6	Video Output	12BY7A	12BY7A	
V7	Sound IF Amplifier-Sync Separator	5U8	5U8	
V8	Audio Detector	3BN6	3BN6	
V9	Audio Output	5AQ5	5AQ5	
V10	Sync Amplifier-Vert. Oscillator	7AU7	7AU7	
V11	Vert. Output	12W6GT	12W6GT	
V12	Horiz. AFC-Horiz. Osc.	6SN7GTB	6SN7GTB	
V13	Horiz. Output	12BQ6GA	12BQ6GA	12CU6 may be used as an alternate
V14	Damper	12AX4GTA	12AX4GTA	
V15	HV Rectifier	1B3GT	1B3GT	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Wells-Gardner PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V16	21ATP4 ①	21ATP4 ①	21ATP4 ① 21ATP4A ①	21ATP4 ②	① Aluminized ② Silver screen "85"
	24YP4 ①	24YP4 ①	24YP4 ①	24YP4 ②	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: Wells-Gardner PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	■140	150	45X421	AFHS1-70	XA004	FP117	TM-140-150	S-100	TVL-1428
C2A	▲125	300	45X419		B028	FP218	TM-12020-300	D-150	TVL-2588
B	■20	300			BRH501	TC3501	TD-100-50	MTH-5010	TVA-1310
C	▲100	50							
C3A	▲125	300	45X420					Q-221.5	TVL-4634
B	■60	300						FM-4530	TVA-1610
C	▲40	50							
C4	4	50	(Note 1)	PRS150V4	BR550	TC30	TD-4-50	MMT-0505	TVA-1303

Note 1. Some versions may use a 5MFD unit (part #45X418) in this application.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Wells-Gardner PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	120		13L8V121K	BPD-00012	D6-121	TP35	GP2K-121	UC-5312	5GA-T12	
C6	5		13L8C050D	NP0-DI5	TCZ-4R7	Z011	NP0A-050	ZT-555	5TCCB-V47	
C7	6.8		13L8C6R81	NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C8	6.8		13L8C6R81	NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C9	2-10		31B-901		829-10					
C10	800		13M-320EA-102ZC							
C11	2.2		13L8GP2R2C	NP0-SI2.2	TCZ-2R2	Z006	NP0A-2R2		5TCCB-V22	
C12	.5-3		31B-902		829-3		3115-01-0R5	CT565A		
C13	1000		13L8X102Z	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C14	1.5		13L8C1R5C	NP0-SI1.5	TCZ-1R5	Z004	NP0A-1R5	ZT-5515	5TCCB-V15	
C15	800		13M-320EA-102ZC							
C16	.5-3		31B-902		829-3		3115-01-0R5	CT565A		
C17	60		13M-320Q-600J							
C18	1		13D-111-2	NP0-SI1	TCZ-1	TZ03	NP0A-010		5TCCB-V1	
C19	10		13L8Q100A							
C20	10		13L8U100D							
C21	1000		13L8X102Z	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C22	800		13M-320EA-102ZC							
C23	800		13M-320EA-102ZC							
C24	1000		13L8X102Z	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C25	1000		13L8X102Z	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C26	800		13M-320EA-102ZC							
C27	10000		47X595	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C28	47		47X603	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C29	47		47X603	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C30	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C31	680		80X5	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C32	56			NP0-SI56	TCZ-56	Z036	NP0-337-560		5TCC-Q56	
C33	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C34	680		80X5	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C35	68			NP0-SI68	TCZ-68	Z038	NP0-337-680		5TCC-Q68	
C36	560		80X9	SI560	DD-561	G063	811-561	UC-5356	5GA-T56	
C37	470		80X4	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C38	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C39	.47	200	RCP10M2474M	P288N-47		CUB2P47		PT4047	2TM-P47	
C40	.047	200	RCP10M2473M	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C41	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C42	47		47X603	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C43	30		47X669							
C44	.1	400	RCP10M4104M	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C45	.047	200	RCP10M2473M	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C46	1.5		47X584	NP0-SI1.5	TCZ-1R5	TZ04	NP0A-1R5	ZT-5515	5TCCB-V15	
C47	22		47X671							
C48	100		80X8	BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C49	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C50	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C51A	1000		80X3	BPD-2X001	DD2-102	DK069	812-001	DCD-521	5HK-2D1	
B	1000									
C52	15		47X672							
C53	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C54	5000		47X507	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C55	.0047	600	RCP10M6472M	SI4700	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C56	330	500	47X570	1469-00033	D6-331	5R5T33	811-331		MS-333	
C57	5000		47X507	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C58	.047	400	RCP10M4473M	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C59A	2000							DC-522		
B	5000		♦76X7	♦PA-110	♦PC-100	♦115TM1	♦1405-01	DC-525	♦V-1	
C	5000							DC-525		

PARTS LIST A

CAPA

ITEM No.	RATING: CAP.	RATING: VOLT	Wells-Gardner PART No.	AEROVOX PART No.	CENT PART
C60	.01	400	RCP10M4103M	BPD-01	D6-1
C61	.022	200	RCP10M2223M	BPD-02	DD-2
C62	.1	600	RCP10M6104M	P688N-1	DF-1
C63	.047	600	RCP10M6473M	BPD-05	DF-5
C64	.047	400	RCP10M4473M	BPD-05	DF-5
C65	.1	400	RCP10M4103M	P488N-1	DF-1
C66	18	500	RCM20B180K	1469-000018	D6-1
C67	82	500	RCM20B820K	1469-000082	D6-8
C68	100	500	RCM20B101K	1469-0001	D6-1
C69	.047	400	RCP10M4473M	BPD-05	DF-5
C70	.047	200	RCP10M2473M	BPD-05	DF-5
C71	.022	200	RCP10M2223M	BPD-02	DD-2
C72	.47	200	RCP10M2474M	P288N-47	
C73	220	500	RCM20B221K	1469-00022	D6-2
C74	.01	400	RCP10M4103M		
C75	820	500	RCM25B821K	1464-00082	
C76	220		80X10	1469-00022	D6-2
C77	.047	400	RCP10M4473M	BPD-05	DF-5
C78	.047	400	RCP10M4473M	BPD-05	DF-5
C79	56	5000	47X755		DD6
C80A	1000		80X3	BPD-2X001	DD2-
B	1000				
C81	10000	1500	47X615		DD10
C82	10000	1500	47X615		DD10
C83	1000	1500	47X573	HVD-15-1000	DD30

Note 2. Not used in some versions.
♦ Items C59A, C59B, C59C, R58A, R58B and R58C ar

CO

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACE Wells-Gardner PART No.	CENTRALAB PART No.	CLA PA
R1A	1000Ω	½	78X22	F1-4	
B	1Meg	½		R2-51	
C	Switch			KB-1	
R2A	500KΩ	½	40X294	AB-59	A47-
B	Shaft		Not Req.	AK-8 *	RS-3
R3A	1.5Meg	½	40X396	AB-742	A47-
B	Shaft		Not Req.	AK-8 *	RS-3
R4A	50KΩ	½	40X395	AB-31	A47-
B	Shaft		Not Req.	AK-8 *	RS-3
R5A	1500Ω	½	40X399	AB-6	A47-
B	Shaft		Not Req.	AK-19	RN-
R6A	2.5Meg	½	40X398	BX-83	A47-
B	Shaft		Not Req.	Not Req.	RN-
R7	500Ω	2	40X397		39-5

Note 1. Part No. 78X23 used in 21" UHF Models-"A" ver
Note 2. Part No. 40X400 used in 24" Models.
Note 3. Part No. 40X402 used in 24" Models.
Note 4. Part No. 40X401 used in 24" Models.
* Shaft must be filed flat.
♦ Universal Replacement (Mallory Exact Duplicate Part
† Concentrikit Equivalent, K-4 Kit, Base Elements & Sh

RE

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Wells-Gardner PART No.	IRC PART No.	NOT
R8	680KΩ	½	12TAE684M		
R9	4700Ω	½	12TAE472K	BTS-4700	
R10	820KΩ	½	12TAE824K	BTS-820K	
R11	470KΩ	½	12TAE474K	BTS-470K	
R12	10KΩ	½	12TAE103K		
R13	220KΩ	½	12TAE224M		
R14	10KΩ	½	12TAE103K		
R15	5600Ω	½	12TAE562K		
R16	15KΩ	½	12TAE153K		
R17	47KΩ	½	12TAE473K		
R18	1000Ω	1	C85102	BTA-1000	
R19	2.2Meg	½	B84225	BTS-2.2Meg	
R20	2.2Meg	½	B84225	BTS-2.2Meg	
R21	1000Ω	½	B85102	BTS-1000	
R22	5600Ω	½	B85562		
R23	470Ω	½	B85471	BTS-470	
R24	47Ω 5%	½	B83470	BTS-47	
R25	5000Ω	4	43X332	PW4-5000	
R26	68KΩ	½	B84683		
R27	470Ω	½	B85471	BTS-470	
R28	47Ω 5%	½	B83470	BTS-47	
R29	47KΩ	½			
R30	22KΩ	½	B84223		
R31	470Ω	½	B85471	BTS-470	
R32	180Ω	½	B84181	BTS-180	
R33	1Meg	½	B84105	BTS-1Meg	
R34	3900Ω	½	B84392	BTS-3900	
R35	1Meg	½	B84105	BTS-1Meg	
R36	3600Ω	4	43X331		
R37	47Ω	½	B84470	BTS-47	
R38	180KΩ	½	B84184	BTS-180K	
R39	15KΩ	½	B85153	BTS-15K	
R40	470KΩ	½	B84474	BTS-470K	
R41	100KΩ	½	B85104	BTS-100K	
R42	100KΩ	½	B84104	BTS-100K	
R43	82KΩ	½	B84823	BTS-82K	
R44	68KΩ	½	B84683	BTS-68K	
R45	680Ω	½	B84681	BTS-680	
R46	330KΩ	½	B84334	BTS-330K	
R47	4700Ω	½	B84472	BTS-4700	
R48	470Ω	1	C85471	BTA-470	
R49	330Ω	1	C84331	BTA-330	

Note 1. Some versions use a
Note 2. Temperature compe
Note 3. Used only in models
Note 4. Used only in models
♦ Items R58A, R58B, R58C,

DESCRIPTIONS
S (cont)

REPLACEMENT DATA				NOTES
RNELL-BILIER T No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
4S1	GP3-333-103	PT411	4TM-S1	
4S22	817-02	PT4122	4TM-S22	
6P1		PT601	6TM-P1	
6S47		PT6147	6TM-S47	
4S47		PT4147	4TM-S47	
4P1		PT401	4TM-P1	
Q18	831-180		MS-418	
Q82	801-820		MS-482	
T1	801-101	MCB235	MS-31	
4S47		PT4147	4TM-S47	
2S47		PT4147	4TM-S47	
4S22	817-02	PT4122	4TM-S22	
2P47		PT4047	2TM-P47	
T22	811-221	MCB240	MS-322	
			4TM-S1	
T82	811-821		MS-382	
T22	811-221	MCB240	MS-322	Note 2
-S47		PT4147	4TM-S47	
-S47		PT4147	4TM-S47	
			75GA-Q56	
69	812-001	DCD-521	5HK-2D1	
D1	1R5KV-102	DC-3021	20GA-D1	

in one unit.

LS

IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
QJ-885	UF13L, UR16L, US-27 ♦	Contrast (Panel) Note 1 Volume (Rear) Attach to RIB.
011-133	U-50	Brightness-Note 2
'Q	DS-37 *	Attach to R2A.
011-138	U-155	Vertical Hold-Note 3
'Q	DS-37 *	Attach to R3A.
011-123	U-35	Horizontal Hold-Note 4
'Q	DS-37 *	Attach to R4A.
011-109	TAP-152L	Vertical Linearity
'Q	Not Req.	Attach to R5A.
011-239	SU-565	Height
'Q	Not Req.	Attach to R6A.
		Buzz (Wire Wound)

4" Models.

P8, P6- 200 (Panel)
P7, R1-218 (Rear)
Switch

S

EM o.	RATING OHMS	RATING WATT	REPLACEMENT DATA Wells-Gardner PART No.	IRC PART No.	NOTES
	22KΩ	½	B84223	BTS-22K	
	150KΩ	½	B84154	BTS-150K	
	2.2Meg	½	B84225	BTS-2.2Meg	
	820KΩ	½	B84824	BTS-820K	
	680KΩ	½	B84684	BTS-680K	
	47KΩ	½	B84473	BTS-47K	
	4700Ω	½	B84472	BTS-4700	
	6800Ω	½	B84682	BTS-6800	
A	22KΩ			BTS-22K	
B	8200Ω		♦ 76X7	BTS-8200	
C	8200Ω			BTS-8200	
	680KΩ	½	B84684	BTS-680K	
	1Meg	½	B84105	BTS-1Meg	
	22KΩ	½	B84223	BTS-22K	
	8200Ω	½	B84822	BTS-8200	
	2.2Meg	½	B84225	BTS-2.2Meg	
	680Ω	1	C84681	BTA-680	
	560Ω	½			
	560Ω	½			
	220KΩ	½	B84224		
	330KΩ	½	B84334		
	820KΩ	½	B84824		
	120KΩ	½	B84124		
	47KΩ	½	B84473		
	82KΩ	½	B84823		
	330KΩ	½	B84334		
	3900Ω	½	B84392		
	22KΩ	½	B84223		
	100KΩ	½	B84104		Note 1
	1Meg	½	B84105		
	56KΩ	½	B84563		
	68Ω	½	B85680		
	470KΩ	½	B84474		
	10KΩ	2	D84103		
	100Ω	2	D84101		
	5600Ω	½	B85562		
	2500Ω	10	43X291	1 3/4A-2500	
	20Ω		43X329		Note 2
	25Ω	10	43X290	1 3/4A-25	
	6.5Ω	20	43X293		Note 3
	270KΩ	½	B84274	BTS-270K	
	7.5Ω	5	43X380		Note 4

resistor in this application.
istor.
al type circuit breaker.
hermal type circuit breaker.
DB, C59C are combined in one unit.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA Wells-Gardner PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	Vert. Osc. Trans.	54X10	B6702	A-3003	209T1 ①	V405	A-8125	26A03	A-97X
T2	Horiz. Output Trans.	53X350	FB419 *①	HVO-36 * ①	235T1 * ①	X094 * ①	A-8253 * ①	FLY-16 * ①	D-50 * ①
T3	Vert. Output Trans.	51X173	Z1900 ② ③	A-2823 ① ③		V302 ① ③	A-8142 ① ③	26S72 ① ③	A-108X ① ③
T4A B	Yoke(90°) Horiz.(25MH) Vert. (41MH)	9A2373-1 ④ 2A435 ⑤							

① Drill new mounting hole(s).
② Use 8 to 1 turns ratio.
③ Connect as auto transformer.
④ Includes resistors R65 and R66.
⑤ Yoke rear cover and centering device.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	4	9	9	9	9	8	9	9
	3	7 or 5	7 or 5	7 or 5	7 or 5	2	7 or 5	7 or 5
	2	N. C. See Note ⑥	N. C. See Note ⑥	N. C. See Note ⑥	N. C. See Note ⑥	N. C. See Note ⑥	N. C. See Note ⑥	N. C. See Note ⑥
	1	1	1	1	1	4	1	1
Special Notes →		⑥	⑥	⑥	⑥	⑥	⑥	⑥

⑥ Install new damping network consisting of approximately 100MMF ⓐ 2KV, and 1000Ω ⓐ ½W, connected in series across terms #3 and #7 of horizontal yoke.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Wells-Gardner PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	3.5KΩ	3-4Ω	51X174	Z1001 ①	A3018 ①	A3849 ①	24S51 ①	S-51X ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA Wells-Gardner PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	5"	PM	3-4Ω	12A527	5A07	205S2	① Used in some versions.
	6"	PM	3-4Ω ①	12A528 ①	6A1	229S1	
	8"	PM	3-4Ω	12A522 ①	8A21	208S2	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Wells-Gardner PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Matching Trans.	0Ω	0Ω	31TA-413				
L2	Ant. Matching Trans.	0Ω	0Ω	31TA-413				
L3	FM Trap	0Ω		31T-417				
L4	IF Trap Coil	.2Ω		31T-418-01				
L5A	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-302-D				Channel 2
B	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-303-D				Channel 3
C	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-304-D				Channel 4
D	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-305-D				Channel 5
E	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-306-D				Channel 6
F	Ant., RF, M Mixer Grid, Osc. Coils	0Ω		31M-307-D				Channel 7
G	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-308-D				Channel 8
H	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-309-D				Channel 9
I	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-310-D				Channel 10
J	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-311-D				Channel 11
K	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-312-D				Channel 12
L	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-313-D				Channel 13
L6	Fil. Choke	0Ω		34A-732				
L7	Neut. Coil	0Ω		31B-727				
L8	RF Coil	0Ω		25A-154-01				
L9	RF Coil	0Ω						
L10	Conv. Plate	.1Ω		31UA-505				
L11	39MC Trap	.1Ω		9A2369		TV-152	6225	
L12	1st Video IF	.1Ω		9A2365		TV-131	6225	
L13	2nd Video IF	.2Ω	.2Ω	9A2363			6222	Includes 47.25MC Trap
L14	3rd Video IF	.2Ω	.2Ω	9A2364			6221	Includes 41.25MC Trap, R29 and C35
L15	Series Peaking Coil	5Ω		9A2375	19-3036	TV-180	6176	30 Microhenries
L16	Shunt Peaking Coil	12.5Ω		36A12	19-4160	TV-184 *	6120 *	160 Microhenries, Wound on 22KΩ resistor
L17	4.5MC Trap	3.2Ω		9A2366	20-1004	TV-151	1469	
L18	Series Peaking Coil	21Ω		36A28	19-4400 ▲	TV-190 ▲	6132 ▲	350 Microhenries, Wound on 6.8KΩ resistor

WELLS-GARDNER MODELS 321A59C (or CT, U, UT) -A-504, 321A59C (or CT, U, UT) -A-554, 324A59C (or CT, U, UT) -A-576, 2321A59C (or CT, U, UT) -A-508, 2321A59C (or CT, U, UT) -A-556, 2324A59C (or CT, U, UT) -A-560

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Wells-Gardner PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L19	Shunt Peaking Coil	16Ω		36A33	19-3250 ▲	TV-185 ▲	6181 ▲	225 Microhenries, Wound on 2. 2KΩ resistor
L20	1st Sound IF	3. 2Ω		9A2366	20-1004	TV-151	1469	
L21	2nd Sound IF	3. 6Ω	3. 6Ω	9A2368	17-3495	TV-113	6203	
L22	Quadrature Coil	5. 8Ω		9A2367	20-1005		1480	
L23	RF Choke	. 1Ω		9A2380	19-1001		4604	1. 5 Microhenries

* Parallel with 22KΩ resistor.
● Parallel with 6. 8KΩ resistor.
▲ Parallel with 2. 2KΩ resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Wells-Gardner PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L24	77Ω		9A2372			6211 ■				Tapped ⑤ 53Ω- Horiz. Osc. Horiz. Waveform
L25	60Ω		9A2371							

■ Enlarge mounting hole.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA Wells-Gardner PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L26	. 255A	41Ω	1HY	52X95-2	C5037 ①	C2996 ①	C2326 ①	26C41	C-17X ①

① Drill one new mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA Wells-Gardner PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	. 255ADC	66X14	1236A	MR300	6S300	6Q4	300	
M2	. 255ADC	66X14	1236A	MR300	6S300	6Q4	300	

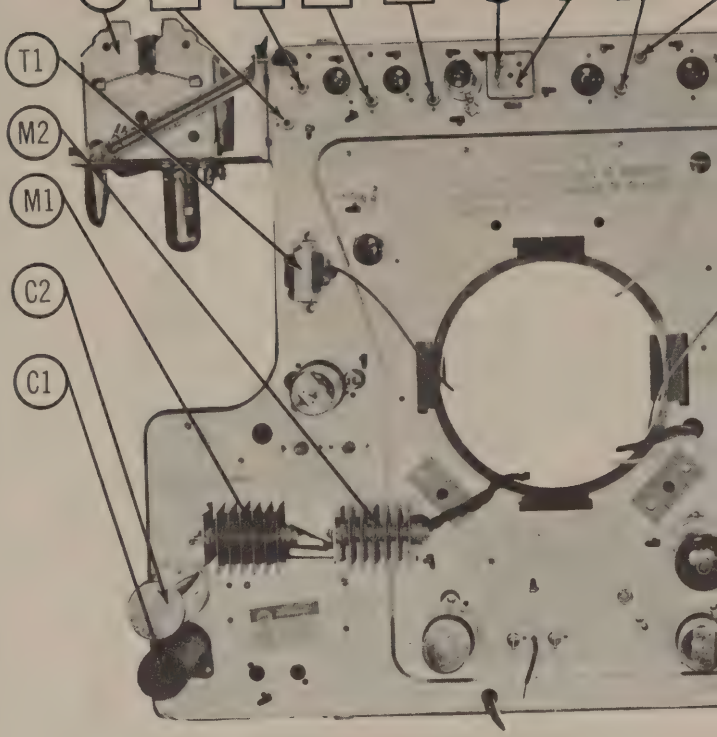
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA Wells-Gardner PART No.	REPLACEMENT DATA SYLVANIA PART No.	NOTES
M3	1N295 *		1N60	Video Det. (Pigtail)

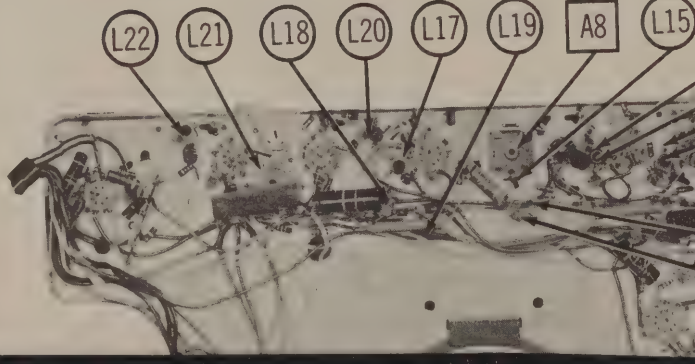
* Some versions may use crystal diode type CK706 or 1N60 in this application.

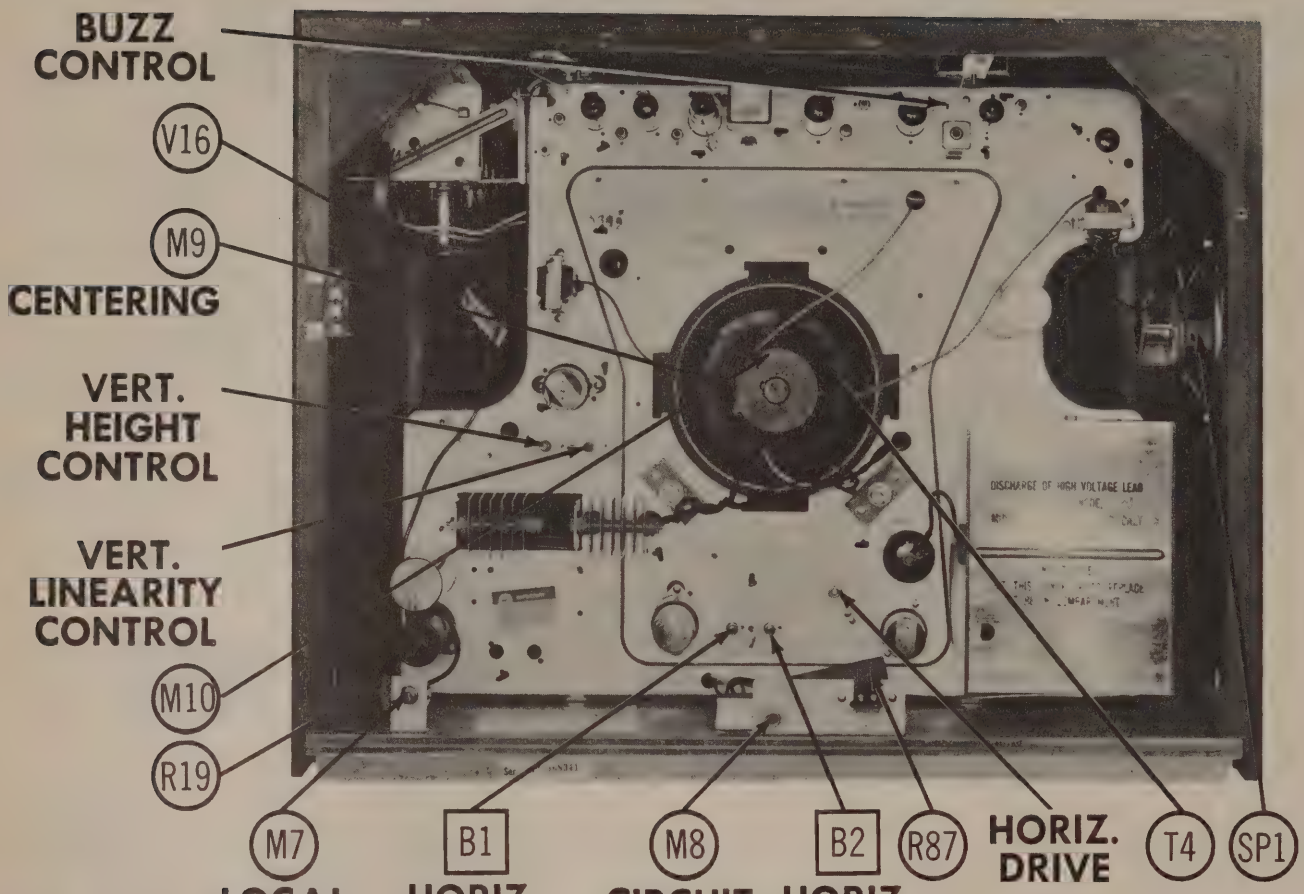
MISCELLANEOUS

ITEM No.	PART NAME	Wells-Gardner PART No.	NOTES
M4	Tuner	25A1133	VHF; VHF Models
M5	Tuner	25A1134	VHF-UHF; VHF-UHF Models
	Tuner	25A1138	VHF-UHF; VHF-UHF Models
M6	Video Det. Assy.	9A2370	Includes M3, coils and capacitors
M7	Switch	2A459	Local-suburban-fringe (SP-3 position, rotary, wafer type)
M8	Circuit Breaker	2A461	Thermal Type-Used in later versions.
M9	Centering Device	2A435	Includes deflection yoke (T4) rear cover
M10	Ion Trap	2A421	
B3	Trimmer Cap.	17A271	Horiz. Drive (170-700MMF)



CHASSIS TOP VIEW





HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Set the contrast control for normal contrast.

1. Set the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

2. Connect the vertical amplifier of an oscilloscope to the junction of L23 and L24 thru a 10MMF capacitor. Connect the low side to chassis. Adjust the horizontal waveform slug (B2) until waveform similar to Fig. 6 is obtained. While making this adjustment keep the picture in sync with the horizontal hold control.

3. Turn the horizontal hold control fully clockwise. Turn B1 clockwise until picture is just ready to pull-in sync.

4. Turn the horizontal hold control fully counter clockwise. Picture should remain in sync. Momentarily remove the signal by switching off the channel and back again. Retouch B1 if necessary.

5. While receiving a signal from a station, turn the contrast control fully counter clockwise, turn the brightness up so that the picture is washed out in appearance. Turn the horizontal drive control (B3) clockwise until white vertical bars appear in the left center of the raster, then slowly turn B3 counter clockwise until the white bars just disappear.

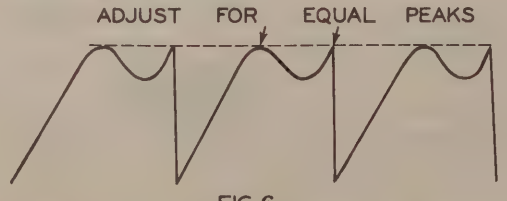
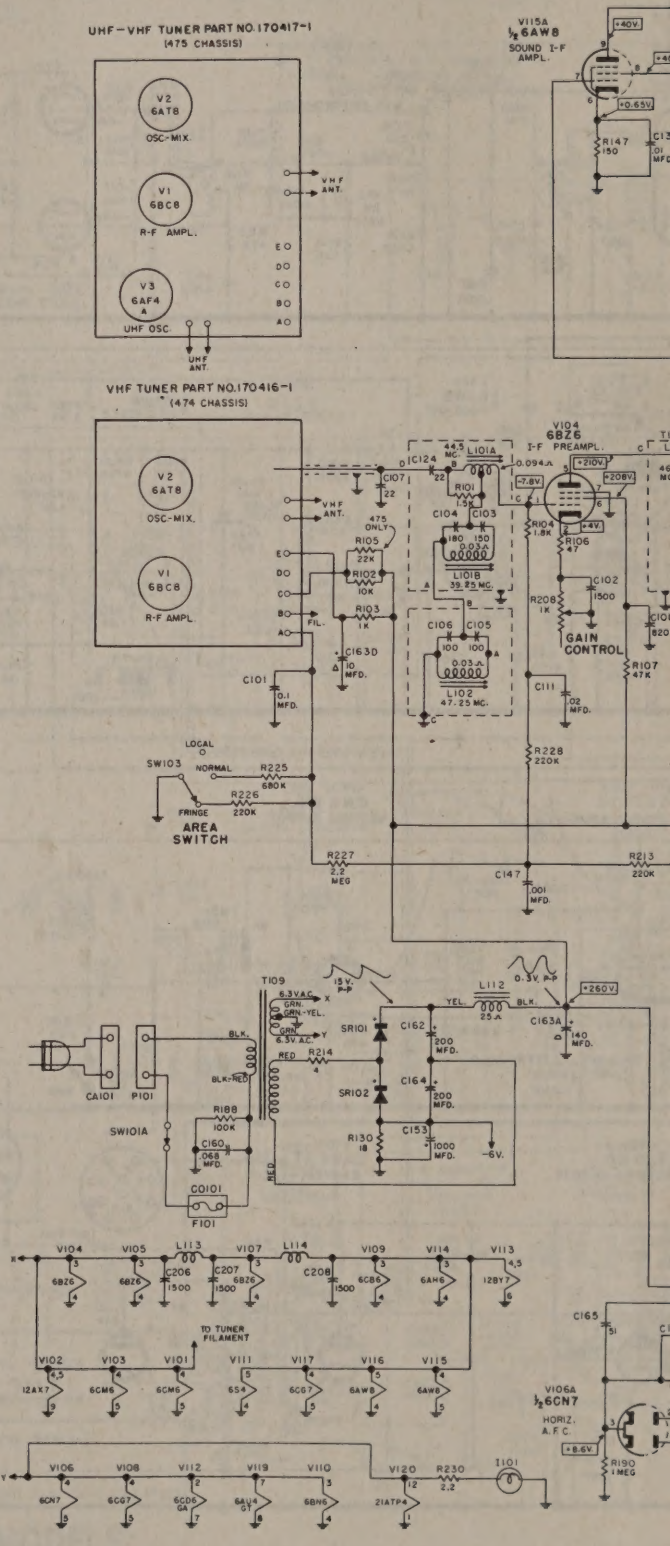


FIG. 6

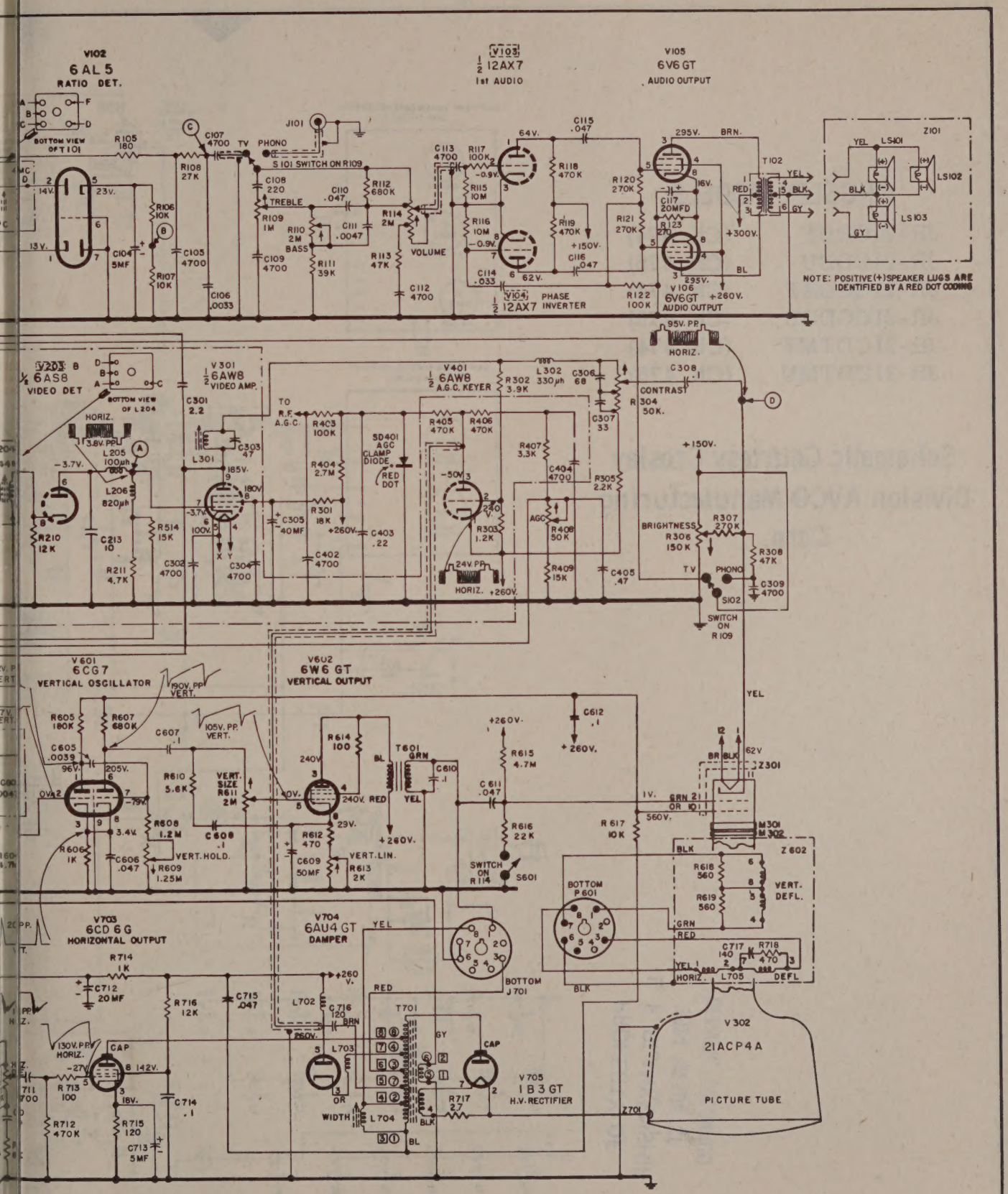
CROSLEY MODELS

JR-21CDBF	(Ch. 474)
JR-21CDBU	(Ch. 475)
JR-21CGDBF	(Ch. 474)
JR-21CGDBU	(Ch. 475)
JR-21CDTMF	(Ch. 474)
JR-21CDTMU	(Ch. 475)

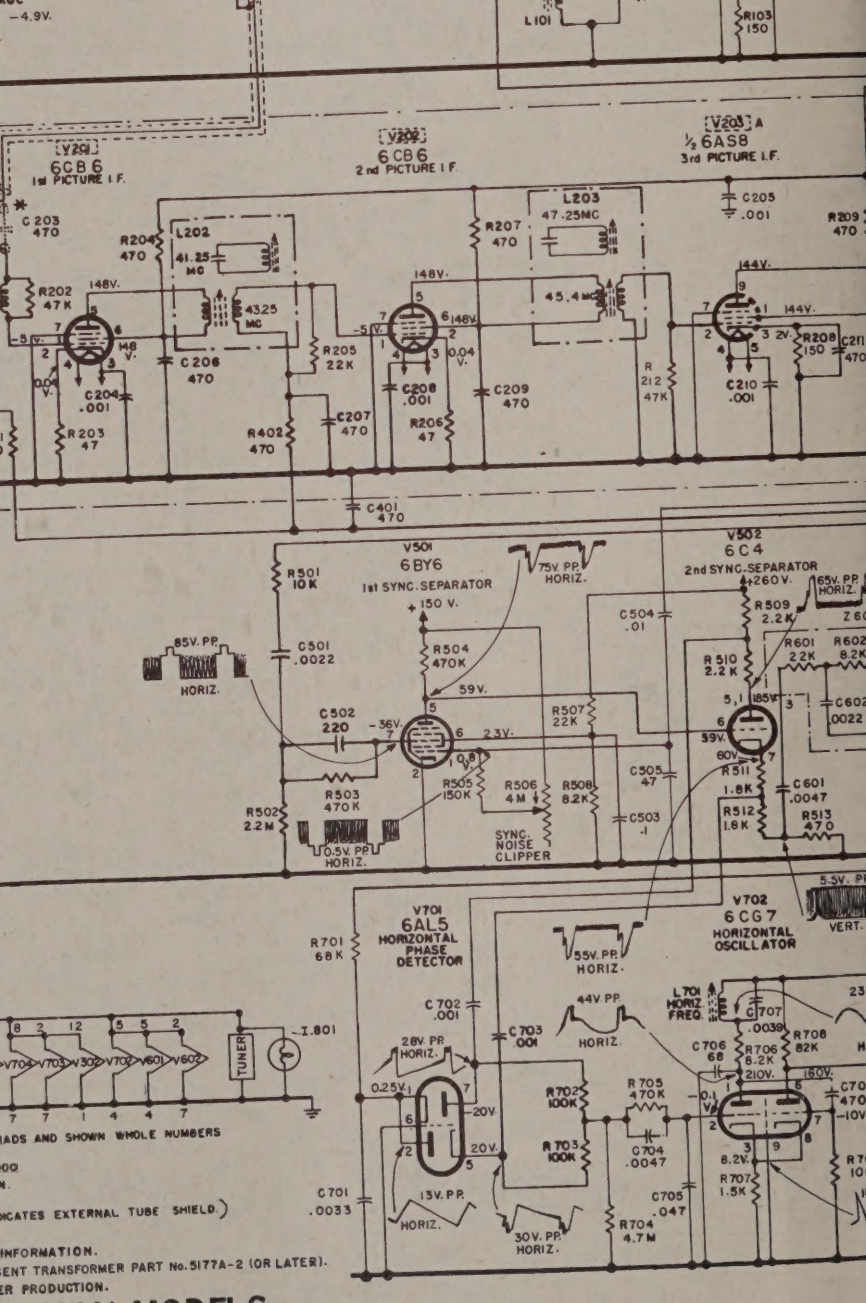
Schematic Courtesy Crosley Division AVCO Manufacturing Corp.

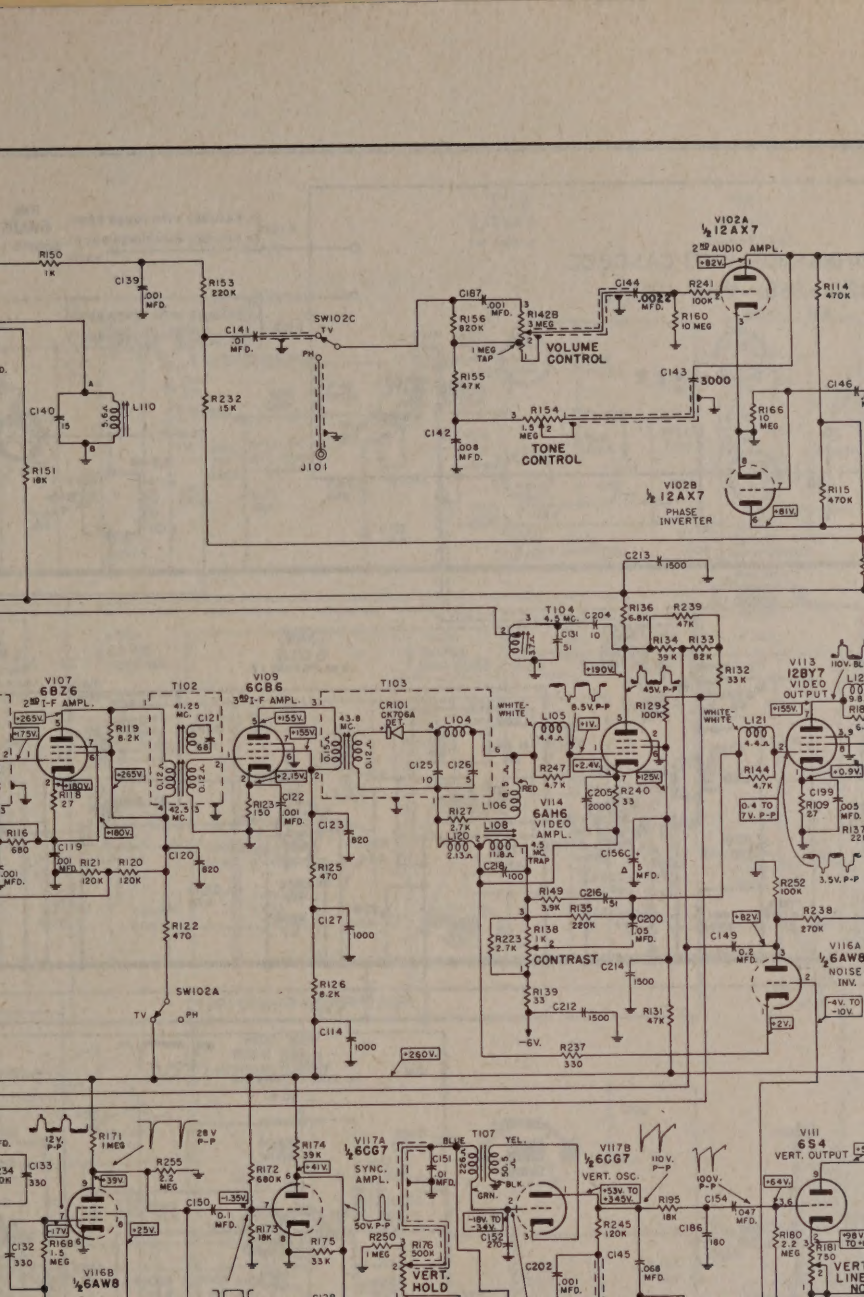


PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



Schematic Courtesy Hoffman Radio


V201
6GB6
1st PICTURE I.F.
V202
6CB6
2nd PICTURE I.F.
V203 A
½ 6AS8
3rd PICTURE I.F.
L202
41.25 MC
4325 MC
L203
47.25MC
45.4MC
V501
6BY6
1st SYNC. SEPARATOR
V502
6C4
2nd SYNC-SEPARATOR
V701
6AL5
HORIZONTAL PHASE DETECTOR
V702
6CG7
HORIZONTAL OSCILLATOR
SYNC. NOISE CLIPPER
HORIZ.
VERT.
TUNER
L701 HORIZ FREQ.
148V.
144V.
59V.
60V.
+150 V.
+260 V.
-4.9V.
-5V.
-20V.
-10V.
-36V.
-1.801
ADS AND SHOWN WHOLE NUMBERS
DICATES EXTERNAL TUBE SHIELD.)
INFORMATION.
ENT TRANSFORMER PART No. 5177A-2 (OR LATER).
ER PRODUCTION.


V102A
½ 12AX7
2ND AUDIO AMPL.
V102B
½ 12AX7
PHASE INVERTER
VOLUME CONTROL
TONE CONTROL
SW102C
SW102A
J101
V107
6BZ6
2ND I-F AMPL.
V109
6CB6
3RD I-F AMPL.
T102
T103
T104
CR101
V114
6AH6
VIDEO AMPL.
V113
12BY7
VIDEO OUTPUT
V116A
½ 6AW8
NOISE INV.
V116B
½ 6AW8
V117A
½ 6CG7
SYNC. AMPL.
V117B
½ 6CG7
VERT. OSC.
T107
V118
6S4
VERT. OUTPUT
CONTRAST
VERT. HOLD
VERT. LINEARITY
R150
C139
R153
C141
C140
L110
R232
R151
C167
R156
R142B
R155
C142
R154
C144
R241
R160
C143
R166
C146
R114
R115
C213
R136
R239
C204
R134
R133
R132
R129
L105
R247
C205
R240
L106
L104
L120
L108
C125
C126
R127
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C114
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R122
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R120
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C121
R119
R116
C156
R149
C216
R135
R138
R223
C200
C214
R139
C212
R131
R237
R252
R238
C149
R171
R255
R174
R172
R173
R175
R250
R176
C151
C152
R245
C145
C202
R195
C154
C186
R180
R181
C133
C132
R168
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